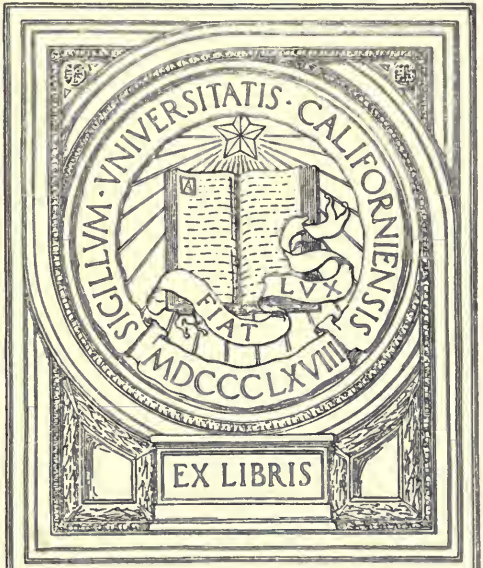
A
000 697 622
9
UC SOUTHERN REGIONAL LIBRARY FACILITY

UNIVERSITY OF CALIFORNIA
AT LOS ANGELES



Major Joe H. Way, M. C., U. S. Army
Base Hospital, Camp Greene,
CHARLOTTE, N. C.

The Mess Officer's Assistant

(Third Edition)

PREPARED BY

MAJOR L. R. HOLBROOK

LATE COMMISSARY, U. S. ARMY

Late Director

Army Training School for Bakers and Cooks

Fort Riley, Kansas

(Eighth Thousand)

AMERICAN LIBRARY ASSOCIATION
SOLDIERS AND SAILORS
CAMP LIBRARY

The Collegiate Press
GEORGE BANTA PUBLISHING COMPANY
MENASHA, WISCONSIN

CAMP GREENE

3781 Cop. 3

COPYRIGHT 1917
By L. R. HOLBROOK

UC
700
H69m

AB 9-7-39

PREFACE TO THE SECOND EDITION.

The first edition of the MESS OFFICER'S ASSISTANT was prepared in the early part of 1908, for the use of student officers taking the course at the Mounted Service School. This edition became exhausted some months ago and rendered a complete revision and re-setting of the type necessary.

The subject matter, though not prepared for enlisted men, was found to be of such general interest to Instructors and Student Cooks as to cause part of the text to be used in our regular instruction.

OCT 7 '38

This book teaches the essential principles to be followed in the messing of troops and contains much information of interest to the officers rather than to the enlisted man. It should, however, be constantly studied in connection with the Mess Sergeant's Handbook which contains much information relative to the financial handling of the mess not heretofore published.

Exchange

L. R. HOLBROOK,
Captain, Commissary, U. S. Army.
January 15, 1911.

302282

PREFACE TO THE THIRD EDITION.

The Second Edition having been exhausted, it has become necessary to print a new edition. Major Holbrook, being absent in France, the new edition has been left to us to get out. It is the same as the old edition with a few minor corrections.

U. S. CAVALRY ASSOCIATION.

INTRODUCTION.

For some years past much experimenting has been carried on to determine the most suitable ration for horses, cattle, hogs, sheep, poultry, etc., with a view to determining what food is the most economical, with reference to the end desired, and today, through mutual arrangements, between Agricultural Colleges and Commanding Officers of military posts, extensive experiments are being made on horses of entire troops and batteries to determine just what amounts and kinds of forage will produce the best results commensurate with, or regardless of, cost.

In regard to human dietary, much has been written and some experimenting has been done, but without doubt we have more reliable information as to the manner of feeding animals than men. Data is available covering experiments with a few individuals, and with small squads of men—soldiers, students and athletes—and the results ably analyzed by physiological experts show beyond a reasonable doubt that people in

general eat too much, especially of protein foods —and that a more rational method of eating brings about remarkable changes in one's desire for food, both as regards class and quantity—and that many diseases are curable through a proper regulation of the diet.

In this little book no attempt has been made to set forth new methods or principles, but to clearly announce those which we believe should be followed in handling the ration as now provided. As desirable as it may be to reduce the consumption of food to actual requirements and to introduce new methods of mastication, it must be recognized that our men are mostly young and hardy, and are daily subject to strenuous outdoor exercise that enables them to consume, with impunity, classes and quantities of food that would be impossible with those whose habits are quite sedentary, or who have already become so disabled through improper dietary habits as to force them to seek renewed youth and energy in new and well proven methods.

Our rations is based upon what men undergoing a considerable amount of labor actually consume, when they are free to choose their food and eat it in such quantity and manner as their

inclination suggests. The minimum consumed by such people has been considered as the least amount that should be supplied as a regular diet. Professor W. O. Atwater placed the daily requirement at 3,500 calories for a man doing moderate work, and at 4,500 calories for a man at hard work. Professor Chittenden has, however, shown conclusively that mental and bodily vigor are maintained and even tend to be greatly increased on a much smaller quantity of food. He shows that the meat proteins especially should be reduced much below that found in the ration allowance, as the amount of toxins present in such foods are sufficient to produce injury in the system, while protein itself is not required in the quantity supplied by the articles now composing the ration, to replace waste and repair the muscular tissues.

The time is not yet ripe, however, to reduce our ration to the standard established by Professor Chittenden. The people at large will first have to be educated up to Scientific Nutrition, and it would be impracticable to change the well established habits of young and growing men, such as now constitute the greater part of the enlisted strength of the Army.

TABLE OF CONTENTS.

CHAPTER		PARAGRAPH
I.	History of the Ration	1–19
II.	Food Values and Elementary Principles of Nutrition	20–35
III.	Elementary Principles of Cooking and Handling Food	36–70
IV.	The Garrison Ration	71–157
V.	Milk, Cheese, Lard, Compound, Etc	158–211
VI.	Preservation of Foods, Bacteria and Mold	212–231
VII.	Brief Extracts from Lectures by the Author	232–250
VIII.	Definitions	251–445
	Index.	

The Mess Officer's Assistant.

CHAPTER I.

HISTORY OF THE RATION.

1. The ration now supplied to the American soldier is beyond doubt the most liberal issued to any Army in the world. Congress has ever been most generous in its appropriations for subsistence, from time to time increasing the food values of the ration, keeping pace with the increased demands of the people in their more elaborate mode of living.

THE RATION FROM 1775 TO 1834.

2. In 1798 the following ration was established by Congress:

Beef, 1¼ pounds per ration.
Bread or flour, 18 ounces per ration.
Salt, 4 pounds per hundred rations.
Vinegar, 4 quarts per hundred rations.
Soap, 4 pounds per hundred rations.
Candles, 1½ pounds per hundred rations.

These quantities were based upon actual necessity and were presumed to be sufficient to sustain the soldier while doing arduous service in the field, as well as in garrison.

3. The above ration differed from that authorized during the Revolutionary War, and for the next half century, chiefly in that liquor was issued at times, and certain substitutes were allowed for beef. The quantities of the components as stated above have remained practically unchanged to the present day.

4. The quality of the ration then supplied was not satisfactory for the reason that Purchasing Agents were allowed 10 per cent. on all savings made to the government—thus placing a premium on the purchase of inferior articles. Later the entire ration was supplied by contract and this was even more unsatisfactory.

THE RATION FROM 1834 TO 1861.

5. Although since 1818 the President has been authorized to make such alterations in the ration as due regard to the health and comfort

of the Army and economy required, little advantage has been taken under this authority to increase the ration, as additional Congressional appropriations are equally necessary.

6. However, in 1834 the President substituted 4 *pounds of coffee and* 8 *pounds of sugar for the liquor component*, and this was increased in 1838 by Act of Congress to 6 *pounds of coffee and* 12 *pounds of sugar per* 100 *rations* "when it can be done to the covenience of the Public Service, and when not so issued to be paid in money." This was the beginning of the now well established custom of making "savings," and it has since been favorably passed upon by the Supreme Court.

7. In 1860 the *allowance of coffee* was increased to 10 pounds and of *sugar* to 15, and prior to the Civil War the *bean component* was added.

8. In 1861 the *allowance of flour* was increased to 22 ounces, and an issue of *potatoes* was authorized three times a week. The *ration of tea* was fixed as at present and allowed to be drawn in the place of coffee—such increase in the ration to be continued during the war.

THE RATION FROM 1861 TO 1908.

9. This ration was, however, reported upon in 1864 as being in excess of the soldiers' needs and was reduced to that issued prior to 1861, with the exception of 4 *ounces of pepper* per hundred rations, which was authorized in 1863 and has continued as a part of the ration to the present day. Incident to this reduction of the ration there was a corresponding increase in the soldiers' pay for the reason that all savings then accrued to the Post and Regimental Funds and not to the immediate benefit of the organization or soldiers upon whom the saving was made.

10. An extra allowance of *one gill of whiskey* for men undergoing hard labor or excessive fatigue was authorized by Act of Congress in 1819, and disappeared in 1878, since which time the issue of whiskey as a part of the ration has not been authorized.

11. In 1890 *one pound of fresh vegetables* was added to the ration, and in 1899 12½ *pounds of dried fruit* for each 100 rations (later being reduced to 10 pounds, and by the ration authorized May 1, 1908, to 8 pounds.)

12. In 1901 the *allowance of sugar* was increased to 20 pounds per 100 rations. No other changes in the Garrison Ration occurred until May 1, 1908.

KINDS OF RATIONS.

13. Prior to 1878 there was but one ration for all purposes known to regulations, although during the Civil War a "Marching Ration" is often referred to, and consisted of salt beef or bacon, hard bread, coffee and sugar.

14. The *Travel Ration* was established in 1878.

15. The *Emergency Ration* was established in 1896 and then corresponded very closely to the "Haversack Ration" of today, but it was soon superseded by a desiccated mixture molded into cakes and hermetically sealed in one-pound cans with a certain amount of salt, pepper and coffee, or chocolate. The present Emergency Ration consists of three cakes of chocolate to which a small percentage of sugar, malted milk and egg has been added in the process of manufacture. The weight is 8 ounces and fuel value, about 1,300 calories.

16. The *Field Ration* was established in 1901, although prior to this time certain changes were made in the "ration" for field service.

17. The *Haversack Ration* was established in 1908. (It is now called the *Reserve Ration*, and the former term is no longer used.)

18. The *Garrison Ration* as now constituted was established in May, 1908, and passed to the cash credit basis July 1, 1910. (See Par. 4, Mess Sergeant's Handbook.)

19. It is noted that in 1819 it was declared on the floors of Congress that the ration was amply sufficient—since which time it has been *decreased by the liquor component only*, while it has been *increased by the coffee, sugar, bean, fresh vegetable, dried fruit, syrup, lard, butter* and *milk components*, in addition to *baking powder, various seasonings* and *extracts*, besides substituting *turkey* or *chicken* for beef on holidays, while many *substitutive articles* have been authorized for issue when, in the opinion of the commanding officer, such issue is necessary for the health of the troops. This elaborate ration was based almost entirely upon actual requirements, as determined from data kept for three years at

the Army Training School for Bakers and Cooks at Fort Riley, Kansas. The quantities of the various classes of foods, *i. e.*, meat, flour, vegetables, coffee, sugar, etc., are about right for supplying a well-balanced diet (though not in all cases quite sufficient), and it is hoped that, since the garrison ration has passed to a strictly cash basis, it will be purchased in about the quantities in which it was formerly issued, and as fully explained in the Mess Sergeant's Handbook.

CHAPTER II.

FOOD VALUES AND ELEMENTARY PRINCIPLES OF NUTRITION.

20. It is impracticable to make more than the briefest mention of the Principles of Nutrition and the Nutritive Values of Food. Very complete and satisfactory information on this subject may be secured from Bulletins Nos. 34 and 142, U. S. Department of Agriculture upon which many of the following statements are based.*

21. A WELL BALANCED RATION is one that supplies proper nourishment to the body without having any component greatly in excess of the requirements. The term is full of scientific significance but conveys little meaning to the average person.

It would be impracticable to lay down a particular diet by weights that could be said to establish the exact amount of protein, fats, carbo-

*See also Wiley's, "Foods and Their Adulteration," Hutchisons's "Foods and Dietetics," and various books on "Military Hygiene."

hydrates, etc., required for any particular person—much less for a company of soldiers whose habits and labors vary from those of the sedentary clerk to the hard working horseshoer or the enthusiastic athlete.

In general, however, it may be remarked that during periods of inactivity the meat component of the ration should be reduced, and that beans and heavy fruit puddings should be used less frequently. At such times fresh fruit and vegetables should constitute a relatively greater portion of the ration consumed, and greater care should be exercised in preparing and serving the food. Savory odors and palatable seasoning will stimulate the appetite and start the flow of digestive juices when the pangs of hunger are bridled by inaction or sedentary habits. Moreover a constant variety of food must be supplied at all times. Prisoners have been known to vomit at the sight of food served in the same form for indefinite periods.

In regard to the company mess it may be said that as a rule the appetite of the average soldier is good and requires no special stimulus.

If the meals are properly prepared he frequently takes too much food on his plate, and eats too fast and too much for his own good.

22. A ONE-SIDED DIET is one in which one or more compounds are supplied in much smaller quantity than is required for proper nourishment. As a result the digestive organs are overloaded with superfluous materials in order to provide proper sustenance. For example, the vegetarian often overworks the digestive organs in order to provide the necessary amount of muscle making material. Many tribes of uncivilized people and certain classes of poor people are either underfed or are forced to eat great quantities of a relatively plentiful article in order to supply the necessary nutrition, but the soldier's ration is selected for him, the food elements are presumed to be in about the proper proportions and generally in sufficient quantity.

23. FOOD by definition includes all those substances that build up the tissues, restore waste, or furnish heat or energy. From 25 to 30 different elements are found in the body, the most important being oxygen, hydrogen, carbon, nitrogen, calcium, phosphorus and sulphur. Both

in our bodies and in the food we eat these elements are, however, combined into certain compounds, the most important of which are *water*, *protein*, *fats*, *carbohydrates*, and *mineral matters*.

The body of the average man contains about 60 per cent. of *water*, 18 per cent. of *protein*, 15 per cent. of *fats*, 6 per cent. of *mineral matters*, and 1 per cent. of *carbohydrates*.

24. WATER neither builds up the tissue nor supplies heat nor energy and hence cannot be termed food, though it is indispensable to our existence. Forty to fifty per cent. of water is found in the ordinary cut of beef, the quantity decreasing with the amount of fat present. Therefore a piece of meat containing a good distribution of fat has a greater fuel value than an equal amount of solid lean meat. (See table of food values following). Fresh vegetables often contain from 80 per cent. to 90 per cent. of water, and dried seeds and cereals as low as from 10 per cent. to 12 per cent. These however, take up a large percentage of water in the process of cooking.

25. PROTEIN compounds are known as the muscle builders. They include:

(*a*) The *Albuminoids* which are found in

great quantities in lean meat, whites of eggs, gluten of wheat, curd of milk, etc., and whose chief function is in building up the tissues and restoring waste.

(*b*) The *Gelatinoids*, which are found in great quantities in the tendons, connective tissues, skin, etc. It is not believed that they build up the tissues, but rather that they protect the albuminoids by reason of being more readily transformed into heat and energy.

(*c*) The *Extractives*, which are the most important part of beef stock, beef extracts and beef tea. (See definitions.) They neither build up the tissues nor supply heat nor energy, but act rather as stimulants and appetizers. The craving for meats, especially in the tropics, is presumed to be largely on account of the extractives contained in them.

26. FATS occur chiefly in the meats, butter, milk, cereals, and nuts. They may be consumed as fuel, but it is believed that they are generally stored in the body as a reserve source of energy to be used when the normal supply of ordinary fuel (the *carbohydrates*) is insufficient.

Fat is the most concentrated form of body fuel, and its high *calorific value* (Par. 34) explains the economy of nature in storing it as a reserve in the body.

The Eskimos consume large amounts of fat daily for the simple reason that they require a great deal of body heat and nature has provided great quantities of it for them in the seal, walrus, etc.

Soldiers serving in Alaska require more heat foods than others, and consequently the bacon and fresh vegetable components of the ration have been materially increased for this service.

27. CARBOHYDRATES. The carbohydrates are the great energy producers. If not required for immediate use they may be transformed into fat and remain stored in the body in this concentrated form until required for use. They are found chiefly in such vegetable foods as flour, rice, potatoes, etc., and in fruits, in the form of starch, sugar and fibers (or cellulose). In young vegetables these fibers are quite easy of digestion but if matured they appear in the

form of toughened strings called woody fiber—and can be broken down only by a long process of cooking. If taken into the stomach while raw or partially cooked they are unfit for food and are practically indigestible.

28. MINERAL MATTERS. Mineral ingredients are found not only in the bones and teeth, but also in the muscles and circulation. They are generally supplied with the ordinary foods in sufficient quantity but yield little or no energy though like water they are necessary for our existence. When food, or the body, is burned the mineral ingredients remain as *ash*.

29. REFUSE AND WASTE. That portion of the food supplied and not generally considered as suitable to eat, or if eaten, is not digested, is termed *refuse*. It may include decayed portions of vegetables, or their husks, hulls, skins, etc., stones and seeds of fruits, bones of fish, etc., etc. The refuse frequently contains the same ingredients as the edible portion, but in such form that it may be difficult to eat, indigestible, or of an objectionable flavor. For these reasons, the value of a food to the system is not always accurately measured by the expressed

calorific value. Refuse should not be confused with *waste*, *i. e.*, with food that should generally be served and consumed, but which, through haste, carelessness, indifference or extravagance, finds its way to the garbage can.

30. CONDIMENTS. The condiments (seasonings) possess little actual food value, but are of the greatest importance in making food more palatable. In doing so they stimulate the flow of the digestive juices and by their presence render the food more easily and completely digested. Among the condiments, salt occupies a unique position in that it is the only mineral that has a food value. It supplies the hydrochloric acid without which digestion in the stomach could not take place. Hence it is indispensable.

31. DOUBLE FUNCTION OF FOODS. *Protein*, *fats*, and *carbohydrates* may all be consumed to supply energy if necessary, though protein alone can build up the tissues. Carbohydrates, fats, and gelatinoids are first called upon to supply energy, thus protecting the muscular tissues (albuminoids) to the last Emaciated men and horses returning from active field service are familiar examples illustrating the loss of fat

and muscular tissue consumed to furnish much of the heat and energy that normally would have been supplied by the fats and carbohydrates of a proper diet.

32. BREAKFAST FOODS. Such foods made from wheat, corn, oats, etc., are placed on the market in the form of "nuts" or "flakes" can have no nutritive property not found in the flour or meal from which they are derived, and the claims of the manufacturers for superior nutrition are considered more or less ridiculous. Such concentrated foods are generally eaten with great quantities of milk (or cream) and sugar, which add enormously to the food value of this part of the meal. The retail prices of specially prepared breakfast foods are from two to five times greater than those of the ordinary cereal products, and if the latter are properly prepared in cooking, evidence derived from experiments does not indicate any difference in the thoroughness with which they are digested, nor in their nutritive value. It is not considered that "concentrated" of "predigested" products possess any special advantage as a food for a healthy man. If specially relished they may be eaten for

variety, as any other palatable food, for they are seldom adulterated. As a matter of fact, however, a certain amount of bulk is considered necessary for the proper peristaltic action of the intestines, and it is believed that healthy digestive organs should perform a normal amount of labor, as well as the brain and the muscular tissue.

33. BRAIN WORK AND ITS RELATION TO FOOD. While intellectual activity is somewhat dependent upon the materials selected by the brain from the blood circulated through it, the particular substances and quantities consumed are unknown. Hence, little confidence should be placed in articles sold on the market as "Brain Foods."

34. FUEL VALUE. The following general estimate has been made for the energy furnished to the body:

Protein, fuel value, 4 calories per gram, or 1,820 calories per pound.

Carbohydrates, fuel value, 4 calories per gram, or 1,820 calories per pound.

Fats, fuel value, 8.9 calories per gram, or 4,040 calories per pound.

It is an interesting fact that the energy given off from the body as heat when the man is at rest, or as heat and mechanical work together, if he is working, exactly equals the latent energy of the material burned in the body. This has been verified by many accurate experiments.

TABLE OF FOOD VALUES.

35. The table on pages 28 and 29, is of special interest when comparing the usefulness to the system of different classes of foods, or when determining the relative value of substitutive articles. For example, in order to keep down the expenses of a mess, and to add variety, it may be desirable to substitute beans for meat on certain days. In both cases, potatoes would probably be served, but when beans are placed on the bill of fare, they may not only take the place of meat, but also of a "second vegetable," as onions, tomatoes, turnips, cabbage, etc.

Assume a mess of 100 men, and that for the noon meal they consume 45 pounds of solid beef, and as a second vegetable, 25 pounds of onions (See Par. 14, Mess Sergeant's Handbook.)

From the tables of food values we note:

45 (pounds round), x 890 (calories)=40,050 calories.
25 (pounds onions), x 230 (calories)= 5,750 calories.

Total.....45,800 calories.

Now substitute a mess of beans for the above; twenty-five pounds of beans and five pounds of bacon (for fat and flavor) is considered sufficient.

From the tables of food values we note:

25 (pounds beans), x 1,520 (calories)=38,000 calories.
5 (pounds bacon), x 2,715 (calories)=13,575 calories.

Total.....51,575 calories.

Assuming that the latter are as fully digested as the meat and onions, it would seem that the ordinary addition of from 20 to 25 pounds of bacon is not only unnecessary, but an expensive luxury.

In the same way it may be shown that macaroni and cheese may be used as a satisfactory substitute for meat, and practical results bear out our theoretical deduction. In either case, the amount of protein (muscle building material) and of fat and carbohydrates (energy producers) compare favorably with that found in the meat. In the same way we may show that fresh garden truck should not constitute the bulk of any meal, or compare the fuel value of coffee, cocoa, chocolate, etc.

Average Composition and Fuel Value of Common Food Products

Food materials as purchased	*Refuse.*	*Water.*	*Protein.*	*Fat*	*Carbohydrates.*	*Ash*	*Fuel value per lb.*
Animal Food.	PER CENT.	PER CENT.	PER CENT.	PER CENT.	PER CENT.	PER CENT.	CALORIES.
Beef, fresh:							
Porterhouse steak	12.7	52.4	19.1	17.9	.....	.8	1,100
Ribs	20.8	43.8	13.9	21.2	.....	.7	1,135
Round	7.2	60.7	19.0	12.8	.....	1.0	890
Fore quarter	18.7	49.1	14.5	17.5	.....	.7	995
Hind quarter	15.7	50.4	15.4	18.3	.....	.7	1,045
Beef, corned	8.4	49.2	14.3	23.8	.....	4.6	1,245
Veal:							
Fore quarter	24.5	54.2	15.1	6.0	.....	.7	535
Hind quarter	20.7	56.2	16.2	6.6	.....	.8	580
Mutton:							
Fore quarter	21.2	41.6	12.3	24.5	.....	.7	1,235
Hind quarter	17.2	45.4	13.8	23.2	.....	.7	1,210
Pork, fresh:							
Ham	10.7	48.0	13.5	25.9	.....	.8	1,320
Shoulder	12.4	44.9	12.0	29.8	.....	.7	1,450
Pork, salted, cured and pickled:							
Ham, smoked	13.6	34.8	14.2	33.4	.....	4.2	1,635
Salt pork	.....	7.9	1.9	86.2	.....	3.9	3,555
Bacon, smoked	7.7	17.4	9.1	62.2	.....	4.1	2,715
Sausage:							
Pork	.....	39.8	13.0	44.2	1.1	2.2	2,075
Soups:							
Beef	.....	92.9	4.4	.4	1.1	1.2	120
Tomato	.....	90.0	1.8	1.1	5.9	1.5	185
Poultry:							
Fowls	25.9	47.1	13.7	12.3	.....	.7	765
Turkey	22.7	42.4	16.1	18.4	.....	.8	1,060
Fish:							
Mackerel, whole fresh	44.7	40.4	10.2	4.2	.....	.7	370
Shad, whole, fresh	50.1	35.2	9.4	4.8	.....	.7	380
Cod, salt	24.9	40.2	16.0	.4	.....	18.5	325
Salmon, canned	.....	63.5	21.8	12.1	.....	2.6	915
Oysters, "solid"	.....	88.3	6.0	1.3	3.3	1.1	225
Eggs: Hen's eggs	11.2	65.5	13.1	9.3	.....	.9	635
Dairy Products, etc.:							
Butter	.....	11.0	1.0	85.0	.....	3.0	3,410
Whole milk	.....	87.0	3.3	4.0	5.0	.7	310
Skim milk	.....	90.5	3.4	.3	5.1	.7	165
Condensed milk	.....	26.9	8.8	8.3	54.1	1.9	1,430
Cream	.....	74.0	2.5	18.5	4.5	.5	865
Cheese, full cream	.....	34.2	25.9	33.7	2.4	3.8	1,885
Vegetable Food.							
Flour, meal, etc.:							
Graham flour	.....	11.3	13.3	2.2	71.4	1.8	1,645
Wheat flour, pat. roller process—High grade and medium	.....	12.0	11.4	1.0	75.1	.5	1,635
Low grade	.....	12.0	14.0	1.9	71.2	.9	1,640

Average Composition and Fuel Value of Common Food Products

Food materials as purchased	*Refuse.*	*Water.*	*Protein.*	*Fat*	*Carbohydrates.*	*Ash*	*Fuel value per lb.*
Vegetable Food—Con.	PER CENT.	PER CENT.	PER CENT.	PER CENT.	PER CENT.	PER CENT.	CALORIES.
Macaroni. vermicelli, etc.	.....	10.3	13.4	.9	74.1	1.3	1,645
Rye flour	.....	12. 9	6.8	.9	78.7	.7	1,620
Corn meal	.....	12.5	9.2	1.9	75.4	1.0	1,635
Oat breakfast food	.....	7.7	16.7	7.3	66.2	2.1	1,800
Rice	.....	12.3	8.0	.3	79.0	.4	1,620
Tapioca	.....	11.4	.4	.1	88.0	.1	1,650
Starch	.....	.....	.....	.....	90.0	.....	1,745
Bread, pastry, etc:							
White bread	.....	35.3	9.2	1.3	53.1	1.1	1,200
Graham bread	.....	35.7	8.9	1.8	52.1	1.5	1,195
Rye bread	.....	35.7	9.0	.6	53.2	1.5	1,170
Sugars, etc.:							
Molasses	.....	.....	.....	.....	70.0	.....	1,225
Sugar, granulated	.....	.....	.....	.....	100.0	.....	1,750
Maple sirup	.....	.....	.....	.....	71.4	.....	1,250
Vegetables:							
Beans, dried	.....	12.6	22.5	1.8	59.6	3.5	1,520
Beans, Lima, shelled	.....	68.5	7.1	.7	22.0	1.7	540
Beets	20.0	70.0	1.3	.1	7.7	.9	160
Cabbage	15.0	77.7	1.4	.2	4.8	.9	115
Celery	20.0	75.6	.9	.1	2.6	.8	65
Corn, green (sweet) edible portion	.....	75.4	3.1	.11	19.7	.7	440
Cucumbers	15.0	81.1	.7	.2	2.6	.4	65
Lettuce	15.0	80.5	1.0	.2	2.5	.8	65
Onions	10.0	78.9	1.4	.3	8.9	.5	190
Parsnips	20.0	66.4	1.3	.4	10.8	1.1	230
Peas, dried	.....	9.5	24.6	1.0	62.0	2.9	1,565
Potatoes	20.0	62.6	1.8	.1	14.7	.8	295
Rhubarb	40.0	56.6	.4	.4	2.2	.4	60
Sweet potatoes	20.0	55.2	1.4	.6	21.9	.9	440
Squash	50.0	44.2	.7	.2	4.5	.4	100
Tomatoes	.....	94.3	.9	.4	3.9	.5	100
Turnips	30.0	62.7	.9	.1	5.7	.6	120
Fruits, etc., fresh:							
Apples	25.0	63.3	.3	.3	10.8	.3	190
Bananas	35.0	48.9	.8	.4	14.3	.6	260
Muskmelons	50.0	44.8	.3	.....	4.6	.3	80
Oranges	27.0	63.4	.6	.1	8.5	.4	150
Watermelon	59.4	37.5	.2	.1	2.7	.4	50
Fruits, dried:							
Apples	.....	28.1	1.6	2.1	66.1	2.0	1,185
Apricots	.....	29.4	4.7	1.0	62.5	2.4	1,125
Miscellaneous:							
Chocolate	.....	5.9	12.4	48 7	30.3	2.2	5,625
Cocoa, powdered	.....	4.6	21.6	28.9	37.7	7.2	2,160
Cereal coffee, infusion (1 part boiled in 20 parts water)	.....	98.2	.2	.....	1.4	.2	30

CHAPTER III.

ELEMENTARY PRINCIPLES OF COOKING AND HANDLING FOOD.

36. OBJECT OF COOKING. Before foods can be taken up and used in the system, they must be changed into forms more *soluble* than those in which they appear in the raw state.

37. *Fruits* when ripening on the trees undergo certain changes—analogous to cooking—in which the component parts are transformed into more digestible elements. Similar changes may take place as a result of cooking or baking, or when the food is acted upon by the digestive juices.

38. Food is cooked to develop certain flavors, to make it more palatable, and to kill disease germs or parasites should they be present. Generally the more civilized a people the more advanced they are in matters pertaining to the preparation of food.

39. METHODS OF COOKING. The object to be attained will often decide the manner of cooking. For example, in *roasting* meat we

desire to retain the juices within. Hence the meat is placed in a very hot oven, to seal the pores and prevent the escape of the juices, the oven being reduced to a lower temperature when the meat has been thoroughly browned.

40. If we desire to make *beef stock* we first place the bones and fresh meat in cold water for some time, as the juices of the bones and meat are readily extracted in this manner. The process is hastened by the addition of a little salt.

41. If a *stew or pot pie* is made, we wish to have a part of the meat juices retained in the meat and a part in the surrounding liquid; hence, we place the meat in cold water, but bring it to a boil as soon as possible in order to seal the pores after a certain amount of the juice has been extracted, and retain the remainder within the meat.

42. If we want the best quality of *boiled beef*, we desire to retain the juices within the meat, and the water is made to boil briskly before the meat is introduced. Upon contact with the hot water the pores are sealed, and the temperature may be lowered, and the cooking continued at a simmering temperature.

43. SIZE OF ARTICLES. The time required for cooking any article depends upon its size; consequently, when several pieces of meat are roasted in the same pan, or when potatoes are baked together in the same oven, an effort should be made to have them of about the same size.

44. REASON FOR UNIFORM TEXTURE. It is owing to the maintenance of an even temperature in the presence of moisture that it is possible to make bread, cakes, meat balls, fritters, etc., of the same even texture throughout, while a thin brown crust is formed on the surface. It has been shown by the use of a maximum thermometer that while the temperature of a baking oven is about 450 degrees Fahr., the temperature within a loaf of bread while baking never rises appreciably above 212 degrees Fahr.,—the highest temperature of free steam.

45. TEMPERATURE OF BAKING, ETC. Frequently too little attention is paid to the proper temperature of the oven and the general character of the meat or other article to be cooked. For example, a temperature that is exactly right for browning a roast would ruin a fruit cake in a few minutes. To properly roast an old tough

piece of meat requires a "slow" oven and much time in order to permit the heat to penetrate to the center and thoroughly dissolve and break down the tissues and thus make it "tender", while a small tender piece of meat could be roasted in a "quick" oven. It is this principle of slow cooking in a moderately low temperature for a long period that renders the "Fireless Cookers" so much superior to anything else for certain kinds of work—especially that of cooking old tough meat until it is "as tender as chicken."

46. HOW TO DETERMINE THE TEMPERATURE OF AN OVEN. The only practical method of getting the temperature of an oven is to insert the hand well into it and count the *number of seconds* that you are able to keep it there. (See definition of oven counts, Par. 391). The burning sensation experienced about the roots of the nails is sufficiently uniform in those performing the duty of a cook to render this a reliable method and it should be followed by the experienced *chef* as well as by the student cook. If the temperature of the oven is somewhat greater than anticipated, food will often give all

the appearances of being well done when, as a matter of fact, the cooking has barely begun. For this reason a cook should have some idea as to the "*times*" *of cooking*, as well as *to oven temperatures*, and tables have been prepared and are inserted in the Mess Sergeant's Handbook.

47. COLD is useful in preventing fermentation and hence is a preservative of food. We constantly make use of this fact by placing butter, milk, meats, etc., in the ice box, by storing certain vegetables and fruits in root cellar and pits in the ground, in preserving yeast by keeping it in a cool place and in stopping the further proving (rising) of dough when it is ready to bake before the oven is ready to receive it. Fresh meat will keep better in a moderately cool, dry place than in a damp ice box at a much lower temperature. However, should hot weather require the use of the ice box, the meat should not come in contact with the walls nor with the ice.

48. *Cold water keeps fresh vegetables* from wilting. It quickly restores such garden truck as radishes, lettuce, onions, etc., that may have been exposed to the sun after gathering, or have

been left in a warm temperature for a time, rendering them fresh, crisp and wholesome. *Potatoes and turnips* that have been peeled must be placed in cold water to keep them crisp and to prevent them from becoming discolored and tough. If cooked while wilted, and discolored, they retain their discoloration and toughness to a considerable extent.

49. Cold water draws out certain *undesirable flavors* in vegetables and certain canned barrelled or dried fish, or meats. The juices of meats and bones are readily extracted in its presence and this process is hastened by the addition of a small quantity of salt.

50. FLAVORS, ETC. Food should possess decided flavors without being too highly seasoned. It should be served hot or cold as intended. Generally we like our tea, coffee, cooked vegetables, and meats served hot while we prefer our drinking water, butter, salads, fresh fruits, such garden truck as lettuce, radishes, and onions and many of our desserts cold. Many components of a meal that are luke warm instead of decidedly hot or cold are most unappetizing.

51. The *heat of cooking* seems to create

new flavors in food and to change the odor, taste and digestibility of nearly all articles of food. It swells and bursts the *starch cells* in flour, rice, and potatoes. It hardens the *albumen* of eggs, fish and meats, and softens the *fibrous substances* in tough meats, vegetables and fruits. It develops new flavors in tea, coffee, roast meats, vegetables, crusts of bread, baked beans, etc.

52. *Air* (or the *oxygen* which it contains) plays an important part in the development of certain flavors. *Steak* broiled in the open air, *bread* toasted in the same manner and *roasted ears of corn* possess certain flavors that cannot be attained in any other way.

It is also noticeable that articles of food, cooked in a closed oven, possess certain flavors that are lost if the cooking is done in the open air on the top of the range.

53. *Baked Apples* have a particularly fine flavor, largely due to transformation of starch into sugar, and to the carmelization of the sugar used in baking.

It is generally held that certain vegetables, such as turnips and cabbage, should be well ventilated while boiling, in order that the obnoxious sulfurous and other gases may escape from the

food, and that, if this is not done, the vegetables will possess an inferior flavor, become discolored, and contain certain elements that are believed to be injurious. Nevertheless, we have been able to boil cabbage and turnips perfectly and retain the fresh color and elegant flavor by submerging them in boiling water for a half hour or so, according to the size. In this way, obnoxious fumes do not escape, but such sulfur as is extracted from the vegetables remains in the water.

54. WATER is a necessity in certain forms of cooking. For example, beans and pease have to absorb a great deal of water to replace that lost in the process of ripening, before they can be made into palatable food. The same may be said of desiccated (dried) fruits.

55. *Soft Water* is used to advantage in softening the texture of meats, in extracting the juices from bones and meat in the preparation of beef stock, and oils from tea or coffee. *Dried beans and pease* should be boiled in soft water, if practicable, as the lime in hard water hardens the albumen present, and retards softening of the vegetables.

302282

56. *Hard Water*, or water containing salt, should be used in boiling *fresh pease and beans*, in order to preserve them whole and retain their juices and flavors.

57. In the preparation of beverages, *fresh water* should be used. It is the air and mineral and vegetable matters contained therein that render it palatable. In the process of boiling, the air escapes with the steam, and the mineral matters are precipitated to a considerable extent. Especially in making tea and coffee, care should be exercised to see that the taste is not ruined by continuing the boiling after the boiling point is reached.

58. Should it be suspected that water contains disease germs, it should be boiled 15 to 20 minutes before using, and if it can then be aerated the taste will be greatly improved.

59. Water is said to be *scalding hot* at a temperature of about 160 degrees Fahr. This temperature is sufficient to burn the skin, burst open starch cells found in potatoes, rice, flour, etc., or to kill the yeast germ.

60. Water is said to *simmer* when the bubbles burst beneath the surface or at a temperature of about 185 degrees Fahr.

61. It *boils* when the bubbles burst at the surface. When this point is reached, the heat applied to the water escapes with the steam, and no amount of fire will raise the temperature of *fresh water* in an open vessel above 212 degrees Fahr., or *salt water* above 224 degrees Fahr.

62. It is a well established fact that water boils at lower temperatures in the higher altitudes on account of the diminished pressure of the atmosphere, and consequently it will take a longer time for food to cook, for, the water holding less heat, the vegetables will be subjected to a lower temperature. The boiling point of fresh water, which is 212 degrees Fahr., at the sea level decreases 1 degree Fahr., for each 600 feet of altitude.

It is frequently reported that beans cannot be cooked thoroughly in high altitudes. In our experience, however, we have found no difficulty in cooking them in various camps at altitudes of over 8,000 feet. If only alkali water is available however, much difficulty is experienced, but this disappears if a pinch of soda is added to the water.

63. The boiling point of water may be raised by the addition of salt or sugar, or any-

thing that increases its density, or by pressure as when boiling in a closed vessel. These facts are taken into consideration in steam cooking, in double boilers, in boiling meats, and in general cooking in the higher altitudes.

64. DEEP LARD. The superiority of "deep lard" in cooking lies in the fact that lard or drippings can be heated to such an extremely high temperature that certain articles can be thoroughly cooked without giving time for the grease used in frying to soak into them. Grease itself boils at about 565 degrees to 600 degrees Fahr., but these temperatures are too high for cooking; the exterior of the food would be burned before it could be cooked through.

65. The grease begins to smoke between 385 degrees Fahr., and 450 degrees Fahr., and this is the best temperature for using it. The great difficulty is that so much food may be introduced at one time as to cool the fat and allow it to soak into the food before it is thoroughly cooked. If this fact is borne in mind almost anything that can be fried at all can be fried in "deep lard." Meat balls, potato balls and croquettes are rolled in egg and cracker or, bread crumbs before frying; the egg coagulates,

and the crumbs which are held in place by it form a brown crust surrounding the ball and the grease is prevented from penetrating further.

Corn fritters contain a great many eggs and a nice crust is quickly formed preventing the penetration of the grease.

66. It is noticed that as soon as the articles mentioned have been dropped into the grease which is far below its boiling point, a violent ebullition is observed. This is due to the escape of steam formed by contact of the moisture of the article introduced, with the hot grease. All articles fried in "deep lard" should have as dry a surface as possible. If food with a damp surface is introduced, grease is apt to be thrown out upon the range, take fire and cause trouble.

67. Oysters should always be fried in deep grease, also doughnuts and all kinds of fritters saratoga chips and French fried potatoes. Sausages and hamburg steaks may be fried in this manner, though it requires care to keep them from going to pieces. Beef steaks and liver may be fried to perfection in deep grease, but this is not recommended in company kitchens as inexperienced men often drop too many steaks into the grease at a time. If the frying in deep lard

is properly done, there will be much less grease used than when it is done in the ordinary manner. Fish fries very nicely in deep lard, but there is the objection that the lard cannot be used again except for frying fish; (unless the fish be quite dry, and free from oil and slime,) and if fish is not on the bill of fare often, one would not care to keep a pot of lard for this purpose only.

68. The *flavor* of articles cooked in this manner is determined largely by the character of the oil, fat, drippings, etc., that have been used. It is probable that anything cooked in olive oil would have a taste superior to that cooked in other oils and fats. If the fat consists entirely of beef suet, or suet and mutton fat, there would be a more or less tallowy taste left in the mouth—depending upon how much of the fat the food had been allowed to absorb. Generally speaking the flavor will improve with the proportion of hog fat used and if possible an attempt should be made to have from a third to a half of it present.

69. FRYING IN SHALLOW LARD (or SAUTEING) is considered the worst form of

cooking, though it will do well enough in camp and when the digestion does not demand special attention. Almost anything that can be fried at all can be fried in deep lard with less disagreeable smoke and a great saving of lard. Too often in frying in shallow lard, much fat is allowed to soak into the food, a part of which is fried until hard, crisp, and indigestible. The same food properly cooked in "deep lard" would have a thin crust throughout.

70. SEASONING. Cooks must not be satisfied with learning the proper proportions of ingredients, and think that the work is done when the cooking begins. *Food must be properly prepared, delicately seasoned and served hot or cold as desired.* Luke warm, ill seasoned food is unpalatable, and if served in a slovenly manner is most unappetizing. Any amount of seasoning at the table cannot make up for poor seasoning in cooking—the same flavors cannot be obtained. It is the Cook who not only gets the proper proportions in cooking, but, who also delicately seasons his food and serves it in an appetizing manner that should be styled *a chef.*

CHAPTER IV.

THE GARRISON RATION.

71. GENERAL REMARKS. A proper handling of the garrison ration requires an intimate knowledge of its composition, for the reason that, although it has now been placed on a strictly cash basis, its value is based upon the quantities of various articles *formerly issued*, and such quantities were determined by the necessity of providing a well-balanced diet. (See Par. 21.) In passing from an issue to a cash basis, the actual value of the garrison ration has been increased from one-half to one and one-half cents, on account of allowing credit for a greater proportion of bacon and jam (relatively expensive articles) than were generally drawn.

In providing for our messes, we should keep in mind the amounts of the various components of the Garrison Ration and in general purchase *about* the amounts of meat, vegetables, coffee, etc., that were formerly issued; and unless some

such system is followed, it is feared that the new mess officer will meet with financial surprises when settling his bills at the end of the month.

COMPONENTS OF THE RATION SEPARATELY CONSIDERED.

72. MEAT. The cash credit derived from the meat component, if properly handled, is sufficient to provide meat in some form for each meal, and still make a saving of about ten per cent. While there is no doubt that we generally consume too much meat in Army messes, it is still considered the basis for each meal, and if it cannot be provided in some form, other articles rich in muscle building material and fat should take its place. Beans flavored with bacon and enriched with its fat, macaroni and cheese, and fish chowder are good substitutes to keep down the expenditure of the meat component. (See Par. 35.)

73. In garrison, such variety of meats can be supplied from the cash credit derived from the meat component as to render it unnecessary, to serve meat in exactly the same form more

than once a week, and few oftener than once in two weeks. (See article for Bills of Fare in Mess Sergeant's Handbook.) Such meats as beef hearts, liver, sausage, pork, fish, etc., procured on the market, or prepared in the kitchen, are frequently as cheap, or cheaper than beef, considering that bone appears in small quantity, or not at all, and with care in their selection and preparation, they will lend almost an endless variety in rounding out the bill of fare. The following is an example of the manner in which the meat component may be handled. Note how the cost of the cheaper and more expensive meats are balanced, so as to provide a desired variety, and still not exceed the cash credit derived from this component.

Example: Assume an organization of 100 men; Commissary price of beef, 7.22 cents, bacon 19 cents, and prevailing prices of the substitutes purchased as noted below:

700 rations of beef, 875 lbs., at 7.22c per lb	$ 63.17
300 rations of bacon, 225 lbs., at 19c per lb	42.75
	$105.93

SUBSTITUTES FOR BEEF PURCHASED.

(See Par. 16, Mess Sergeant's Handbook.)

			per. lb.	
1.	Beef Hearts	(Dinner)	40 lbs. at 6c	$ 2.40
2.	Spare Ribs	(Dinner)	56 lbs. at 10c	5.60
3.	Headless Pickerel	(Breakfast)	30 lbs. at 9c	2.70
4.	Bacon & (See Par. 35)	(Dinner)	6 lbs. at 19c }	2.70
	Beans		25 lbs. at 6c }	2.64
5.	Frankfurters	(Dinner)	40 lbs. at 8c	3.20
6.	Ham Butts	(Dinner)	45 lbs. at 12c	5.40
7.	Brains	(Supper)	45 lbs. at 6.5c	2.93
8.	Bacon and Beans	(Dinner)	Same as No. 4	2.64
9.	Bacon	(Breakfast)	20 lbs. at 19c	3.80
10.	Beef Liver and	(Breakfast)	22 lbs. at 5.5c	1.21
	Bacon		10 lbs. at 19c	1.90
	Total cost of substitutes for beef			$ 34.42
	Balance of cash credit on beef			71.51
				$ 105.93

The balance of the cash credit ($71.51) is sufficient to purchase 990 pounds of beef at 7.22 cents per pound. While providing meat for one-third of the meals in the ten day period, even when most of the meals were the heaviest of the day (dinner) we have expended less than one-third of the cash credit derived from the meat component. It would seem that considerably less than two-thirds of 1,000 rations of beef, *i. e.*, 2-3 x 1,250 or 833 pounds should still be consumed in the ten day period, and therefore that even a greater saving than 990:833, or 157 pounds of beef, at 7.22, or $11.34, should be saved on this component for general purchases.

This result corresponds very closely with our School records, which show that we actually do save more than 10 per cent. on our meat component. In any case, a judicious substitution of the cheaper meats, bacon and beans, macaroni and cheese, fish chowder with a well seasoned sage dressing, etc., will provide for the purchase of chicken, pork or high grade fish for Sunday dinners, and at other times.

74. Much study must be given to the cutting up of meat so as to use it to the best advantage in the kitchen. Being supplied in bulk, it is necessary for the Cooks to have some knowledge of the proper method of cutting it up for kitchen use and they should know for what purpose each cut is best adapted. All parts of the meat, as delivered, can be put to some use. Parts especially good as roasts, if in sufficient quantities, should not be consumed in stews or pot-pies, nor should steaks be used for soup stock, but each part should be worked in to the best possible advantage. The new Manual for Army Cooks gives instructions for handling meat that should be closely followed by the Cooks.

75. *Special Uses.* The tougher parts of fresh meats, not otherwise consumed, should be

put through the grinder and used up in *Hamburg steaks*. Except in hot weather, corned beef should be regularly prepared by the Cooks and in sufficient quantity for use with, or without cabbage, about once in ten days. *Beef cheese* should be prepared and consumed about as often. *Sausage* may be prepared to advantage in the kitchen whenever pork is available, and frequently at less than market price. All left-over meats should be used up in *meat balls*, *croquettes*, *hash*, etc., and no cooked meats should be thrown away, except that which has been taken on the plate and has not been consumed.

76. *Preservation of Meats.* Meats should not be allowed to spoil in the hands of the cook. Lacking facilities for its preservation while fresh, it should be roasted dry, boiled, corned, or worked up into cheese for future use.

77. *Lean Meat.* Lean meat contains a very high percentage of water—about half—and if fat is present, the water is proportionately less. Therefore, in roasting lean meat, suet should be added. Remember that meat is best when medium well done.

78. *Bacon.* The best use for bacon in garrison is to give flavor to other articles and to enrich them with its fat. In the ten day period from one to three messes of beans may be served. For use with them, in soups, and as seasonings, and for one meal during the ten day period, from 40 to 50 pounds would be required for 100 men.

79. *Tough Steaks, Etc.* Observe carefully the principles of cooking, as laid down in Chapter III. If old or tough meats have to be used, remember that a long period of slow cooking is best. For example, prepare the steaks, medium well done, from one to two hours before the time for serving and let them stand in a heated earthen jar (or other receptacle), either on the shelf of the range, or in a pan of boiling hot water, until meal time. All solid meats, roasted or boiled, might well be treated in the same manner, slicing them immediately before serving in order to retain the juices. So long as a temperature above 130 degrees Fahr., is maintained, changes go on within the fibrous tissue and render it tender.

All meats should be sliced in the kitchen before serving in order that fats, gristle, and other

portions that will not be eaten if taken on the mens' plates, may be saved and either rendered out, or served in some other form. Serve all sliced meats on platters so that the men may help themselves. For the same reason, *stews*, and *pot-pies*, should be served in suitable eathernware dishes. There is sufficient in the ration to give the men plenty, and any tendency to take more on their plates than can be eaten will disappear under proper supervision of the Mess Sergeant.

80. *Soup Stock.* Soup stock should be made fresh every day or two. Cut the fresh meat into small chunks, break or saw the bones and place them together in cold water for several hours, if practicable, and then set on the range and allow to simmer for eight or nine hours. The juices of the meat will be extracted in about two hours of simmering, and it should be removed from the boiler at the end of that time, in order that the fibers will not become hardened and indigestible. (See Par. 81.) Cooked meat, if used, should be added after the boiler is placed on the range. When prepared, strain the stock into earthen jars and set in a cool place. The grease will rise to the top and harden, and can then be easily removed. Clean out the stock boiler and

start over next time with an entirely new lot of bones and meat. The stock is used, not only in making soups, but also in hash, meat balls, pot-pies, gravies, sauces, etc., and sometimes in mashed potatoes.

81. *Prevent Waste.* No portion of the meal or bones should be thrown away so long as any nutriment remains in them. Remember that in boiling beef, only the juices are extracted, and that most of the nourishment remains in the meat, though by continued boiling, the fibers are hardened and rendered less digestible. If run through the hash machine, the meat from the stock boiler can be used to advantage in hash, meat balls, croquettes, etc., though if used alone, it will be dry and tasteless, on account of the absence of the extractives.

82. *Soup.* A rich, well-seasoned, stock soup should, as a rule, form a part of the dinner each day. It should be served in a course by itself, and before the more substantial part of the dinner is brought on. The soup should be set out in covered tureens each of which should be provided with a deep ladle, so that the men may help themselves. Serve plenty of croutons, or crackers

with it, and see that it is hot when served, and that the grease is skimmed off. In our experience, 10 to 12 gallons is disposed of regularly by a company of 100 men. If the soup is served with the more substantial part of the meal, you should very properly expect the men to pass it by in order to get their share of the pot-pie, etc., and to get it while it is hot. If it is served in the manner indicated, there will be small loss. All that is left in the tureens may be saved and used up in some other form for supper, or other subsequent meal.

Strain the soup and save the vegetables and meat for hash, meat balls, etc. The stock may be used again in soup on the following day, or added to hash, gravies, etc. Especially in warm weather stock in which vegetables have been cooked, will sour in a short time and hence it must be used up at once.

83. BREAD AND FLOUR. In the Training School kitchens about 10 per cent. is saved from the cash credit derived from this component, *i. e.*, after purchasing the bread consumed in the mess and sufficient flour for all other purposes, about 10 per cent, is left to apply, for example,

on breakfast foods, which are consumed almost daily, but for which no cash credit is allowed. It is considered that not more than two-thirds of the credit on this component should be expended for bread, and that if more bread is purchased, it must form so great a part of the diet that probably it is the best time on the bill of fare, and the mess is a poor one. If the meat and vegetables are well prepared, the organization will not begin to spend its credit from this component for bread, and if hot rolls, buns, biscuits, etc., are frequently made, the purchase of bread should decrease in proportion, as we are but adding variety by giving the flour to the men in a slightly different form.

84. Flour is the cheapest food that can be constantly used in the kitchen, nutritive value and general usefulness considered. It is rich in muscle building material and in starch, which is converted into sugar and fat, and a study of the various methods of handling it will more than pay for the trouble.

85. Bread should be purchased in small quantities as required, from day to day, especially if rats and mice are numerous, and a good

bread box has not yet been provided. Just before mess call, it should be cut into thin slices and piled closely on the plates. Toward the end of the meal, only small quantities should be cut, in order to have but few unused slices remaining. Unused slices should not be thrown away, but should be piled closely on the plate, in the form of the loaf as cut, and covered with a slightly dampened cloth, and put away to be served first at the next meal.

86. *Crumbs.* Crumbs and dried pieces of bread, and bread that is slightly heavy and not desirable for the table, should be saved and placed in a flour sack, suspended in a dry place in the store room or elsewhere. From time to time, they should be toasted and ground into powder or fine crumbs, for use in the place of cracker dust, in the preparation of meat balls, potato balls, croquettes, etc. The crumbs of bread, or good slices, may be used in the preparation of bread pudding, in stuffiing, etc., or put into cubes, toasted and served as croutons with soup.

87. *Milk Toast.* This is a dish that is seldom made, but cheap and greatly appreciated. In its preparation, much bread that might otherwise

become dry or moldy is prepared in a palatable form.

88. *Bread and Rolls* that have been dried out to some extent may be greatly freshened by moistening slightly and placing in a slow oven for half an hour. The moisture within the loaf or roll that has disappeared by combining with the crumb, will be reconverted into steam and permeate the whole, giving it the appearance of fresh bread.

Observe the following methods: Place a moistened dish towel in the bottom of a bake pan and then place the rolls upon it, folding the ends of the towel over the tops of the rolls and sprinkling lightly those exposed. Place in a slow oven (say 25 counts) for about half an hour, and the rolls will be ready to serve. Or, place a pan of steaming hot water on the bottom shelf of the oven, and a pan of rolls on the top shelf, leaving the door on the second notch, to give circulation of steam, and re-heat as before. Or, place a pan of rolls in a larger pan of hot water, and cover the whole with another pan for about 20 minutes. See that the surface of the rolls is dry before serving.

To further use accumulated bread crumbs, or to cheapen the cost of running the mess, a goodly proportion may be mixed in with the *hash* and all *similar preparations*, in *Hamburg steaks*, in *pan cakes*, and in *fruit pudding*. Flour may even be made to take the place of starch in *sweet sauces*, with but little detriment and little chance of detection.

Soups and *stews* will be greatly improved by dropping small pieces of dough into them while boiling hot, about 10 minutes before serving.

89. *Pan Cakes.* In many organizations any attempt to serve pan cakes has been given upon account of the apparent necessity of serving them cold. To obviate this, place a hot bake pan on the shelf of the range and as fast as the cakes are fried pile them carefully in tiers of about one dozen each and they will keep hot for a long time. Cover with a clean dish towel, also using one beneath the pile of cakes.

Frequently the pan cakes that are fried first are tough and soggy, for the reason that griddle is not hot enough and as a result the batter is heated gradually and the gas escapes, thus render-

ing a cellular structure impossible. Again, the last cakes fried are apt to be heavy, for the reason that the batter has been standing in a warm room for some time, allowing the gas to expand and escape from the batter before it is placed on the griddle.

The right way is to get the griddle hot, then add baking powder to a portion of the batter only —say one-fourth—preparing the remainder in similar quantities just before you are ready to fry it into cakes. The griddle should be smoking hot, and the batter just thin enough to spread readily to the desired thickness on the griddle. As soon as the bubbles begin to appear, and before they have broken at the surface, the cakes should be turned back again to finish frying on the side first coming in contact with the griddle.

Batter cakes can just as well be made by setting a sponge (that is by using yeast), thus making a small saving in money and incidentally avoiding any difficulties met in handling baking powder. In addition, a small amount of baking powder can be added to advantage in the manner above indicated.

90. *Hard Bread* is occasionally ordered sold, by the Commissary, in order that a fresh supply may be kept in store. The small quantity purchased may easily be disposed of as follows: Toast into a quick oven and break into soup immediately before serving. Use it in making chowder. Prepare a bread and apple pudding. Use in making pan cakes, or any of the ways indicated for crumbs and dried bread.

91. *Corn Meal.* Corn meal should be used occasionally to break the monotony of oatmeal as a breakfast food. It may also be served for breakfast or supper in the form of mush, or corn bread and sirup, or made into a genuine hoe cake. Left-over mush of any kind may be sliced when cold, fried and served hot with or without sirup.

92. There will be an additional fund accruing from this component, by way of a *bakery dividend* at the end of each quarter. This dividend will be small—possibly $.003 or $.004 per pound of bread purchased by the organization, depending upon the extra duty paid the bakers, the price of flour, yeast, etc., used in the bakery.

93. Baking Powder. The allowance of bak-

ing powder is generally sufficient, but the amount to be purchased depends largely upon the amount of yeast used in the kitchen. The allowance will permit of making one component of one meal every day, say batter cakes, biscuits, etc. Roughly speaking, an estimate, of baking powder to be used will be about three-fourths ounce per pound of flour required for the batter cakes, biscuits, etc., or possibly not more than one-half of an ounce, if a good baking powder, such as Royal, or Price's, is used.

94. In using baking powder, remember that it is a mixture of an acid and an alkali, which remain inert so long as they are kept perfectly dry, but quickly unite in the presence of water, liberating the carbonic gas, which gives to the dough the porous structure. (See definitions.) The quantity of gas liberated by a given amount of any particular powder is definite, and fixed in quantity, and its premature escape will ruin the food that is being prepared, making it heavy and soggy. Heat hastens the formation and escape of the gases, therefore *use cold water in the mixtures containing baking powder*, and bake at once; or, until the dough prepared can be baked, it should be kept in a cool place. Note that the method of

handling baking powder mixtures is exactly opposite to that followed when handling yeast, where warm water (of 80 to 90 degrees Fahr.) should be used, in order to facilitate the fermentation and formation of gas, and for the same reason an even, warm temperature is required while the dough is rising.

When using yeast, there is a continuous formation of *gas* which is stopped only by killing the yeast germ in the oven. *With baking powder*, there should be little evidence of its presence until the dough has been placed in the oven, when the heat causes its rapid expansion. The oven heat forms a crust, seals the pores, and fixes the framework before the gas has had an opportunity to escape and allow the dough to drop back to its former condition. It is just at this critical stage that a jarring of the dough may rupture the cells that have formed and cause the cake or other preparation to fall.

95. *A fairly good baking powder* can be made as follows: Take 16 ounces of *cream of tartar*, 8 ounces of *baking soda* and 4 ounces of *corn starch*, and mix thoroughly by putting through the sieve at least nine times.

96. *Yeast.* The cook who is familiar with handling yeast in the kitchen has an immense advantage over the one who is not, and he can run his kitchen at a relatively lower cost, while setting a better table and providing a greater variety of food for his men.

The reason is this: Flour is the cheapest component of the ration that can be used in quantity in the kitchen, and consequently any increase in this component over the normal amount will lessen the general expense of running the mess. Furthermore, by the use of yeast, we can supply every day a different variety of hot rolls or cold bread, in the form of Parkerhouse Rolls, Tea Buns, Cinnamon Buns, Coffee Cakes, Crullers, Jenny Linds, etc. The men never tire of these articles, while baking powder biscuits, is used constantly, turn against the stomachs of those men not accustomed to eating them. As a consequence of eating more than a normal amount of the cheaper component, the men eat far less of the more expensive articles.

97. THE BEAN COMPONENT. The cash credit derived from this component is more than sufficient to cover the dried vegetables

that can generally be used to advantage in the kitchen even during the winter and early spring, considering that the beans used with bacon as substitute for beef are considered as bought from the meat credit allowance. (See Par. 35). The variety being served should be as great as possible, and not consist of the issue beans and rice only.

98. Special care should be exercised to see that beans are thoroughly done before serving. They should be whole but so soft as to be easily mashed in the fingers. Remember that soft water is best, and if the water is very hard, one-half to one teaspoonful of soda per gallon of water should be added. We do not endorse the general method advocated for baking beans, "Soak all day, and boil all night," but in order to prevent the formation of tough, detached hulls, recommend that they be soaked not longer than from one to three hours, boiled not longer than one hour, and thereafter allowed to simmer (say at 180 degrees Fahr.) until done. In this way, the hulls disappear entirely, and the beans remain whole, giving fine, nutty flavor.

If beans are well cooked, they are an invaluable food for the soldier while doing arduous

service, but if not thoroughly done, they are irritating, indigestible, and productive of much intestinal disorder. *If the beans or pease are ground*, they are much more quickly prepared and are more readily digested. Bean and pea meal is strongly recommended for soups and stews in the field. (See Par. 100–a.)

99. Beans, while an *excellent food for the robust and healthy*, and for persons leading an active life, are considered *unsuitable for persons of sedentary habits* and for the invalid and convalescent.

Beans and pease contain much muscle building material, but are deficient in fat. With the designated amount of fat added, they approach the food value of fresh beef, though they are not so thoroughly digested. (See Par. 35.)

100. For an organization of 100 men, the following is about the maximum amount of dried vegetables that can be used to advantage in a ten day period, even during that portion of the year when fresh vegetables are not abundant.

(a) *Issue Beans, 75 pounds.* This is sufficient for two messes of baked beans, one mess of stewed beans, and one soup. There is a general

idea that beans cannot be baked without soaking, but we find that if simply placed in cold water, brought to a boiling point, and left at a simmering temperature for about ten hours, equally good results are obtained. In cold or moderate weather, the beans may be soaked for five or six hours, though we cannot see that any great benefit results from so doing, and in hot weather they are more liable to sour.

For flavor and fat (in which beans are deficient) about 15 or 20 per cent. of sliced or diced bacon, ham, or salt pork, should be added before baking. If additional bacon is served with the beans, (an unnecessary extravagance) it should be fried or boiled, and served separately, and not cooked with them, as it would make them too greasy. Beans are cooked only fairly well in the type of "fireless cooker" now provided. They must, however, generally be boiled for at least an hour before being placed in the cooker, and be carefully insulated, and even then, it is frequently necessary to re-heat them before serving.

(b) *Dried Pease*, 20 pounds. This is sufficient for one mess of stewed pease. Add five pounds of diced bacon, and serve as a vegetable.

Dried green pease (whole) are handled in exactly the same manner as dried beans, except that very little sugar is added. They may be baked or stewed.

(c) *Lima Beans*, 20 pounds. This is sufficient for one mess of stewed beans. Add five pounds of diced bacon and serve as a vegetable. Lima beans break up very easily in cooking; therefore, as soon as they are brought to a boil, they should be set back on the range, or in a pan of boiling water, and allowed to simmer until well done, about two and one-half or three hours being required.

(d) *Kidney Beans*, 15 pounds. This is sufficient for one mess of stewed beans. Add five pounds of diced bacon, cook over night in an oven and serve as a vegetable Handled in the same manner as issue beans, except for seasoning.

(e) *Chili Beans*, 25 pounds. This is sufficient for one meal of *Chili con Carne* and one mess of stewed beans. To serve as a vegetable, add five pounds of diced bacon and cook for three or four hours. They are better, however, when

baked over night. Kidney beans and issue beans may also be used in Chili con Carne.

(f) *Rice.* Rice is very easy of digestion, and is relished by the soldier, if properly cooked, *i. e.*, so that, when ready to serve, the grains are nicely separated from each other and so soft as to easily mash in the fingers. Rice is rich in starch and is consequently an important source of energy, rather than a builder of flesh and muscle.

For one hundred men, supply about 25 pounds for the ten day period, with the expectation of preparing one meal of curry and rice, one pudding, and one mess of boiled rice, in addition to using it in soup.

To boil rice, place in plenty of water—say four times its volume, and let boil until the rice can be almost mashed between the fingers, but is still a little stiff, say for twenty minutes. Set a colander on the drain board and pour the whole contents into it. There will be sufficient heat remaining to finish the cooking, so that the grains may be mashed in the fingers, but are still separate and whole. Place in a clean receptacle and set in a warm place until served.

If the rice has been boiled too long, it should be chilled at once by placing under a cold water spigot, or by immersion in a vessel of cold water, removing at once.

(g) *Dried Sweet Corn*, 15 pounds. This is sufficient for one mess of stewed corn and one of soup. It takes up water very readily—about twice its weight—and can be prepared in about three-fourths of an hour. If, however, the corn has been cured when nearly ripe instead of when in full milk it may be necessary to soak for 3 or 4 hours and cook for the same period.

(h) *Hominy*, 10 pounds. It may be served as a vegetable if boiled (with diced bacon added), or it may be boiled, and when cold, sliced, fried, and served with sirrup. If milk is available, "Hominy and Milk" may be served.

101. VEGETABLES. The cash credit derived from the potato component is sufficient to cover the cost of all fresh vegetables required for the kitchen, providing that the quality is up to the standard, and the Commissary makes good all loss from decay and sprouts. Where a good garden is maintained, a considerable saving should be made on this component.

From 14 to 16 ounces of potatoes is sufficient for the daily consumption of one man. The *onions* should not exceed about 10 per cent. of the issue. They are used best for the purpose of seasoning, though they may be served to advantage as a vegetable about once in ten days. The same may be said of tomatoes. When fresh vegetables are abundant, a saving should be made on the potato component with a view to making other purchases.

102. *Potatoes* should be stored in a *cool, dry place.* Warmth and moisture hasten decay and promote the growth of sprouts. The sprouts should be removed as soon as they appear, as their growth exhausts the starch and renders the potato unfit for food.

Potatoes are about *two-thirds water.* The solid matter consists mostly of starch, though albuminous matters and salts are present in small quantities. In the presence of cold water a portion of the starch is drawn out and settles to the bottom of the receptacle.

Potatoes that have been *frozen* and quickly thawed are said to be sweeter than others. Frozen potatoes should be kept in this condition

until used. To thaw them out, place in cold water and leave until used.

103. After pealing, potatoes should be *placed in cold water* and allowed to remain there until ready to cook. If exposed to the air, they will become dark colored and very tough, and will retain these characteristics, to a certain extent, after cooking.

Potatoes should be *boiled until the starch cells are broken.* This requires about thirty minutes, depending upon their size, and this condition is noted by the easy penetration of the tines of a fork. The water should now be drawn off, and the potatoes should be allowed to steam for about five minutes with the lid off, when sufficient water will have escaped from them to make them mealy. Should the water not be allowed to escape from them in this manner, the starch will absorb it, making the potato gummy. It is said that the longer the potato remains in a dry heat above 125 degrees Fahr., say up to one and one-half hours, the more "nutty" and sweet the flavor will become.

104. For the reason stated above, the *skin of baked potatoes* should be pierced with a fork

or broken to allow much of the moisture contained within to escape. When the skins of boiled potatoes are broken, they will remain mealy for a long time if kept warm, but if skins are not broken, they will become soggy. Only starchy foods like potatoes and rice can be kept for a long time in this manner, without losing their color, or acquiring a strong flavor.

Boiled, mashed, or baked potatoes become hard and gummy upon cooling, due to the absorption of the water by the starch from the ruptured cells.

105. DEFINITIONS.

(a) *Saratoga Chips* are thin slices of raw potatoes, fried in deep lard.

(b) *French Fried Potatoes* are strips of potatoes of about one-third of an inch cross section, cut lengthwise from the raw potato, and fried in deep lard.

(c) *German Boiled Potatoes* are boiled potatoes cut to about the size of an egg, with a small amount of browned onions spred over them.

(d) *German Fried Potatoes* are raw potatoes sliced crosswise and stewed in a closed vessel (or baked) in a small amount of onions, stock and fat.

(e) *Browned Potatoes* are raw or boiled potatoes, well greased and baked in a brisk oven. Small potatoes are frequently used up in this way, but all should be of about the same size.

(f) *Hashed Potatoes* are chopped boiled potatoes, mixed with stock, placed in a well greased bake pan, greased well over the top, and baked in a brisk oven.

(g) *Cheesed Potatoes* are the same as hashed potatoes, with a small amount of grated cheese added.

(h) *Lyonnaise Potatoes* are prepared by placing boiled potatoes in a bake pan, covering them with about one-tenth the amount of fried onions, spreading over with fat, and baking in a brisk oven.

(i) *Creamed Potatoes* are prepared from raw potatoes, cut in small chunks, and stewed in a cream gravy, or from boiled potatoes similarly prepared and covered with hot gravy.

106. *All left over potatoes* can be used up in the form of fried potatoes, in meat balls, or in hash. The whole potatoes may be cut up and used in creamed potatoes, salads and soup, in addition to the forms just mentioned. As a rule vegetables left over from any meal should be used up in some other form within the next twenty-four hours. In warm weather, they are apt to sour if kept for a longer period. It is a good rule to use up for supper all foods left over from breakfast and dinner.

107. *Onions and Tomatoes.* Onions are most valuable as a seasoning for soups, stews, and Hamburg steaks, and in the preparation of salads, lyonnaise potatoes, and beef steak smothered with onions. *Boiled Onions* are a very palatable dish, and should be served with cream sauce. Onions so served are soothing to the mucous linings of the stomach. In any form they are said to possess certain medicinal properties.

Tomatoes are used in much the same manner, being most valuable as a seasoning for sauces, although they may be served as a vegetable or a salad.

108. *Cabbage.* In preparing cabbage for cooking, it should be first quartered longitudinally, and held for a few minutes with the head submerged in salt water, to which a little vinegar has been added. This will rid it of worms and insects. It is one of the most useful vegetables when properly cooked, and is invaluable in the fall and winter when other vegetables are scarce. Cabbage contains a certain amount of sulfur, and is apt to be indigestible and produce flatulence when improperly cooked. Cut the cabbage crosswise in rather small chunks, and *completely submerge while cooking.* If allowed to "steam" for a long time, or if cooked longer than necessary, it becomes discolored, tough and indigestible. It should be done in about one-half hour. When cooked with meat, do not add the cabbage until one-half hour to 40 minutes before time for serving.

109. *Parsnips and salsify* are important vegetables for the company mess, as they withstand the frost and may be left in the ground over winter, making it possible to have these vegetables in the spring when other vegetables are scarce. They should, however, be dug in

the early spring, as they otherwise will become fibrous and tough.

110. *Turnips, beets and carrots*, for summer and fall use, should be the quick growing kind, and should not be allowed to attain any great size. When grown for winter use these vegetables, like others that are stored, should become well matured, as otherwise they will not keep.

111. *Lettuce, radishes and onions*, for use during the summer, must be planted at short intervals, in order to keep the table well supplied with tender fresh vegetables. The more rapidly they grow the more tender they will be. They should be kept in cold water, or at least *cool and moist*, from the time they are gathered until they are served on the table. If these vegetables become wilted, they will be greatly freshened by a few minutes immersion in cold water.

112. *GENERAL REMARKS.* All green vegetables should be firm and fresh when put on to cook. New vegetables that have lost this property can be made crisp in a few minutes by soaking in cold water. Older vegetables may require hours. Potatoes that have been kept over

until spring should be peeled and soaked in cold water before cooking.

113. *Vegetables should be placed in cold water*, brought to a boil and cooked continuously until thoroughly done, but no longer. The boiling in the case of potatoes, turnips, beets, cauliflower, etc., should not be so violent as to cause them to fall to pieces. In practice, we seem to get equally good results by placing the vegetables in boiling water, and frequently do so as a matter of convenience.

114. *During the cooking* of most kinds of food, certain gases are developed, which, if retained in the food, give it a strong flavor and odor, and there is reason to believe that they are injurious. If ventilated, these gases will pass off in the steam, but if submerged while cooking the disagreeable odors are avoided as the sulfur, etc., is retained in the water.

115. *Overcooking* changes and toughens the texture of vegetables and injures those substances that contribute to their flavor. Such vegetables are inferior in flavor and appearance, and are often indigestible and unpalatable.

116. DRIED FRUITS. This component

of the ration is an important one, not especially on account of its food value, which is relatively low, considering the food served, but for the reason that the peculiar *fruit flavors* do much to tone up and render palatable an otherwise monotonous or uninviting diet.

117. *A small amount of certain kinds of acids* seems to be craved by the stomach, and fruits supply them in a very attractive manner. *Green fruits* contain a relatively large amount of acids, and the irritation to the linings of the stomach is such as to cause diarrhea and colic. The smaller amount supplied by *ripened fruits* is sufficient to lightly stimulate the action of sluggish bowels and is therefore a valuable addition to the ration.

118. *The dried fruits issued* are all easily prepared for the table. They are too frequently set out in the form of a stew—this being the easiest way for the cook to get rid of them. Each can, however, be made into a very palatable "butter" which is greatly relished by the men. They can all be used as fillings to pies, in rolls, cobbler, bread puddings, plum duff, etc. To further increase the variety of the dried fruits

a saving from the cash credit accruing from this component should be applied to the purchase of fresh fruit.

119. *All dried fruit should be washed* in from one to three waters, to remove the sand. worms, etc., that may be present. They should then be placed in cold water and be allowed to soak for from one to three hours, then brought to a boil in the same water, and allowed to *simmer* until thoroughly done.

120. *The following receipe for "butter"* was furnished by Major Wilkins, Subsistence Department. It has been tried with excellent results.

1. Thoroughly wash the evaporated fruit.

2. Cover with plenty of water and soak over night.

3. Stew slowly until tender.

4. Rub through a colander and add three-fourths of a pound of sugar to each pound of dried fruit originally used, also one teaspoonful of cloves and two of cinnamon and a little vinegar to each pound of dried fruit.

121. COFFEE. Our coffee rations is much abused. It is now issued roasted and ground,

and in a wooden crate or box with paper lining. It quickly loses its aroma after the package is opened and the coffee exposed to the atmosphere. Upon receipt, it should be at once transferred to air tight cans or jars. It would, however, be far better to roast green coffee in small quantities, grinding for each meal only such amount as may be consumed at that time. Roasted and ground coffee is easily adulterated, but its use is generally recommended as few Army Cooks can roast coffee to perfection.

122. *Remember that in making coffee, fresh water should be used,* and under no circumstances either before or after the coffee is introduced should the water be allowed to boil so violently as to carry off the air it contains. With the disappearance of the air, the coffee becomes more or less flat and insipid. If the water is allowed to boil after the coffee is introduced, the volatile oil which gives it the fragrant aroma, is quickly dissipated and fills the room with an agreeable odor, but ruins the coffee. Furthermore, boiling of coffee for more than five minutes extracts the tannic acid and forms injurious compounds. It combines with cream or milk and forms a leathery, indigestible compound that irritates

the membranes of the stomach. The coffee should not be allowed to accumulate, for more than three meals or be carrried over from one day to the next. Thereafter the first grains introduced supply practically nothing but color, and a bitter taste.

123. For the reasons stated, it is evident that it is best to *make coffee in a porcelain lined receptacle or a jar*, rather than iron or tin, when practicable. In preparing the coffee, the boiler should be allowed to remain on the range until the water comes to a boil; add the coffee and set the boiler off, or where it will only simmer for a half hour or so before serving. If there is not sufficient time for this, the coffee may be allowed to boil about five minutes before setting off the range.

124. *Allow one pint of liquid coffee per man.* Starting out with fresh coffee, use five ounces of the ground coffee per gallon of water. For the next meal, add to this four ounces of coffee for each gallon water of added, and for the next meal three. After having allowed the coffee to accumulate for three meals, throw it all out and thoroughly scour the boiler before the next meal.

If desired, the coffee may be placed in sacks while cooking, but it should have plenty of room to allow circulation of water through it. By this method, the boiler is kept cleaner, but it takes longer to extract the flavor. It is recommended that where practicable the coffee grains be placed in a open sack supported by a ring resting on lugs on the inside of the boiler, and that the water be poured through the sack at least twice.

125. *When soup is served*, coffee need not be, though if it is, the consumption is reduced about one-half, and frequently the same is observed when water is placed upon the table, for very often the men take coffee only because there is no water at hand.

126. *We recommend that coffee be served in porcelain lined coffee pots*, so that the men may help themselves, and in order that the coffee may be kept hot, instead of giving up the greater portion of the heat present to bring up the temperature of the heavy chinaware pitchers that are frequently used. If coffee is served in the heavy chinaware cups, it will generally be cold before the men are ready to drink it, and in addition,

much will be served that will not be consumed and is consequently a dead loss, whereas if it had been left in the coffee pots, it could have been retained, and used up at the next meal. The coffee allowance is sufficient for serving twice a day only—say by using five ounces per gall (1 pint per man) for breakfast, and four ounces for each gallon of water added to that left over from breakfast. If tea is used for the second meal, a money saving is made.

127. Coffee stimulates the nervous system without reaction and retards changes in tissues. Its effect on the digestion is the subject of much difference of opinion. Chicory and coffee extracts are considered both harmless and worthless. Especially in the field, the full strength of the coffee is desired and the so-called substitutes serve but to deceive the uninformed.

128. TEA. Tea is coming more into favor with our men, and is now used quite generally for supper each day. It has practically the same physiological effect as coffee, but has the advantage of lightness and smallness of bulk. In preparing tea, it is best to first pour over it a small quantity of boiling hot water to cleanse it and

remove such coloring matters as may be present. Then put the leaves in a tea basket, or muslin sack, in an earthenware receptacle and pour boiling hot water through them and allow to "draw" for about five minutes before serving. If the leaves stand longer in the water, a bitter flavor is drawn out which is very objectionable.

129. Three-fourths of an ounce per gallon makes a very strong tea, and one-half ounce, medium. Sliced lemon is said to be a good substitute for milk in tea. It is claimed that it prevents the headache and sleeplessness to which many persons are subject from its use.

130. SUGAR. Sugar may be considered a cheap article of diet, considering the high nutritive value, which is not generally appreciated as it should be. In most organizations, this component is hardly sufficient. Generally about 25 per cent. more than the issue allowance is consumed, although in some cases a small saving is made. Next to fat and oil, it furnishes the most complete food for heat and energy that can be consumed. It is a quick acting food, being readily absorbed into the circulation and is therefore especially valuable to relieve exhaustion. It is

particularly useful for soldiers engaged in a forced march.

We are of the opinion that, if sugar is placed on the table for general use, and extravagant waste prevented by the Mess Sergeant, it would not greatly increase the bills at the end of the month. If eating more than a normal amount of sugar, a lesser amount of higher priced food will be consumed. Granulated sugar is considered the best and the cheapest to use. Cut-loaf sugar would prove expensive in mounted commands, as soldiers are not slow in rewarding their favorite mounts with a few lumps when it can be done with so little effort.

131. The men should be allowed to sweeten their own coffee, but the Mess Sergeant will have to caution them against extravagance by leaving unused sugar in their cups. During the first week of such liberty the consumption of sugar is quite large, but under proper supervision, it soon subsides to a normal expenditure.

132. Granulated sugar makes an excellent sirup for table use; it is cheaper than other sirups and generally better liked by the men. In making the sirup, take a gallon measure and put one quart of water in it; then add about six and

one-half pounds of sugar, and let boil for about fifteen minutes. If the resulting mixture is less than one gallon, add sufficient boiling water to make the full gallon and allow it to boil for a few minutes. For flavoring, use one-fourth pint of vinegar as part of the liquid added, or better still, use lemon instead of vinegar, and one-half ounce of lemon extract. Juices of fruits may be used wholly, or in part, in the place of the water.

133. EVAPORATED MILK has been reduced from the "whole milk" and to restore it to its former consistency, it is necessary to add the same amount of water as was evaporated. For oat meal, two one-pound cans of evaporated milk in sufficient water to make a gallon of milk. In our experience, we favor the use of evaporated milk in company kitchens. It has been sterilized, is of uniform quality, and is well liked by the men. When using only the issue allowance, we do not attempt to put it in our coffee, but reserve it for puddings, sauces, cakes, etc.

134. *Powdered Milk* will probably come into more general use, especially in the field. About one pound of the powdered milk per gallon of water is considered sufficient.

135. CONDIMENTS OR SEASONINGS are not, as a rule, foods in the strictest sense of the term, but they are quite an essential part of the diet. They are important, in that they improve the appetite and the digestive powers, and are consequently more important for the invalid and convalescent, and those of sedentary habits than for the healthy person. Experiment shows that for the latter, unseasoned foods are quite as easily digested as others, though eaten with less relish.

136. The allowance of seasonings is just about sufficient. Any excess used, or any savings made, will generally affect the cash account but little. *Condiments act through the senses of smell and taste* reflectively on the digestive organs, as well as locally when coming in immediate contact with the linings of the stomach. In either case the flow of the digestive juices is stimulated and the digestion is aided. In those particular cases where the linings of the stomach, intestines, etc., are already inflamed, high seasoning must be avoided.

137. *A food is but half prepared when the cooking is only done.* It requires delicate, varied,

and well-selected seasoning to do the rest. Too many cooks are devoid of a keen sense of taste, or at least exercise little or no judgment in seasoning their food; they too often rely upon pepper and salt alone. This is just the reason that soups are so frequently held in disfavor in the service at large. The *first* requirement is a good stock; *second*, a varied and substantial filling (various kinds of mixed vegetables—say one quart to the gallon, dried bacon, etc.); *third*, a palatable seasoning such as can be obtained from red peppers, chopped parsley, and a limited assortment of herbs properly applied. Varied and savory condiments are necessary to tone up an otherwise flat and insipid dish and make it popular and much craved by the men, instead of a repulsive "dish-water" introduction to the meal.

138. *Sugar*, though constantly used for seasoning, is most useful as a food. The sweetening element is saccharin, which has no food value. Use one to two pounds per gallon of mixture with puddings, custards, and sweet doughs. For rice tapioca pudding, etc., double the amounts of seasoning used. Generally, from three to four

ounces per gallon of coffee is considered sufficient, when the coffee is sweetened in the kitchen.

139. *Salt* is the only condiment actually necessary to health. It is probably taken in sufficient quantities in ordinary foods, but such additions as may be made to give an agreeable flavor is not injurious. In seasoning soups, three-fourths of an ounce of salt per gallon; for stews, and mashed potatoes, about one-half of an ounce per gallon.

140. *Bacon* (or *Ham*) diced or sliced, can be used to advantage in almost any meat, fresh or dried vegetable component, and nothing is relished more. Use about one pound of bacon to five pounds of dried vegetables, or to fifteen pounds of fresh vegetables.

141. *Onions, parsnips, carrots, tomatoes, salsify, etc.*, have a valuable place in the seasoning of soups, stews, etc., and are much appreciated. In soups we use about one quart of mixed chopped vegetables in addition to about two ounces of rice, or barley, or macaroni, etc., for each galllon of liquid.

142. *Pepper* is stimulating when used in small quantities, but irritating when used to excess.

Red or Cayenne Pepper is far more wholesome than black or white pepper, though not commonly used. In seasoning soups, use one-eighth of an ounce per gallon, and for stews and mashed vegetables, about two-thirds as much. Two sweet red peppers per gallon of soup is ample.

143. *Garlic* is much used in small quantities to bring out the flavors of other condiments. For example, one or two of the small bulbs would be sufficient for eight or ten gallons of soup.

144. *Mustard*, when used in small quantities, is good for digestion. It can be used to advantage with ham, baked beans, and other heavy foods, and when such foods are served it should be placed on the table.

145. *Herbs*, such as mint, parsley, thyme, bay leaves, capers, etc., are found in considerable variety on the market at very reasonable prices. They are used to great advantage in meats, stews, soups, chowders, and sauces. Use one bunch of green parsley for five gallons of soup, and in addition, one-half teaspoonful of dried herbs.

146. *Spices* are generally used in cakes, and articles of food containing sugar, and sometimes with meats, either whole, ground, or as an

extract. *Ginger* is perhaps the most healthful, and is often used in sickness, and as a tonic in hot weather. *The other spices* are better mixed in small quantities, for example, using less of cloves and more of cinnamon, but no one spice greatly predominating, or in sufficient quantity to hide the natural flavor of the food.

147. *Flavors* are all good in small quantities. They should not be added while the article is hot, as the heat wastes their strength—the aroma passing off with the vapors. When possible, it is best to use *natural fruit juices*. Others are much subject to adulteration.

148. *Lemon and Vinegar* increase the solvent power of the gastric juice, and are useful with meats and vegetables that are difficult of digestion. A little vinegar or lemon juice added to tough meats before cooking does much to break down the resisting fibers.

149. LARD, ETC. The credit allowance for this component is generally sufficient. If a standard quality of beef is supplied and the suet with surplus fat is carefully rendered, this with the trimmings of fat from roasted and boiled meat, and the grease skimmed from stock, soups,

and gravies, will furnish all shortenings, drippings, etc., required for kitchen use. If a pork carcass, or parts of a carcass, with all the natural fats is supplied from time to time, a corresponding saving should be made on this component.

150. *Handling the Suet.* Keep a long, deep, narrow bake pan constantly on the range for a general receptacle for beef fat, etc. Each day place the suet and fat trimmings in the pan, and from time to time, as the floating grease gathers on the surface of gravies, soups, stews, etc., skim it off and transfer it to the pan. All fats should be trimmed from cooked meats in the kitchen and saved in the same manner. At the end of the day, the accumulated grease is strained off into an earthenware receptacle and set in a cool place. The pan is thoroughly cleaned and a fresh start made each day. The accumulation of grease, which includes all that collected in the kitchen, excepting lard (hog fat), is called *drippings*, and is used for general purposes—generally in deep or shallow fryings, or, if carefully strained, in ordinary pastry work. *For the latter, lard is better, but the drippings may be used in anything that is to be eaten hot.* On account of the relatively high melting point

of beef fat, a slightly tallowy taste is sometimes left in the mouth after eating cold preparations in which the drippings or suet have been used.

151. *Compound.* If additional shortening is desired, it is recommended that compound be purchased instead of lard (see definitions). It is perfectly wholesome, devoid of objectionable flavor, and comparatively cheap.

152. BUTTER. If this component used is on the table, it can be served three of four times, in the ten day period, besides being used sparingly in cooking. Note, however, that the government allowance is one-half ounce per man per day, and where individual butter plates have been used, many organizations have served it once each day, *e. g.*, for breakfast, with hot cakes, or for supper, with hot rolls, with entire satisfaction. Many organizations prefer to save it altogether, and make other purchases instead. If difficulty is experienced in living on the straight ration, it is recommended that this component be saved, and if "butter" is desired, oleomargarin, which is every bit as good, be purchased (uncolored) at from one-half to two-thirds the price.

153. When butter becomes lightly rancid it should be worked over in cold water, and then the desired amount of salt added. If but slightly rancid, it may be used in custards, cakes, pies, etc. If rather too rancid for this purpose and yet not very stale, it may be refreshened as follows: Place the butter in plenty of hot water and let it boil for about half an hour, set to one side and when the water has cooled to, say about 55 degrees Fahr., the butter will have hardened on the surface so that it may easily be removed in the same manner as cakes of grease from beef stock.

Or, the butter may be placed on the range and boiled until the moisture and acids have been evaporated, but in this case, the butter will take on a darker color. If heated in a steam jacket boiler, the removal of the moisture and acids will take place at a lower temperature, and the butter will not become discolored. Boiled butter does not possess a very fine flavor, but will keep as long as lard under the same conditions.

154. SIRUP. This component is provided in about the right proportion, but the men do not always like the brands generally sold at the Commissary, on account of their peculiar flavor;

and a cheaper grade, either purchased on the market, or made from granulated sugar, is frequently more acceptable.

155. *Salads.* A good potato salad (or one of onions, beets, or lettuce) can be used to advantage in the company mess for the Sunday evening supper. After a hearty "Sunday dinner" a cold supper may be prepared, and bologna, cold roast beef, or ham will furnish a suitable meat component for the meal. At other times during the week, as when baked beans, pease, or other dried vegetables are used, a piccalilli salad, hot or cold slaw, or other similar preparation of which vinegar or pickles form a part, can be used to advantage. On days when baked beans have been on the bill of fare for dinner, it is frequently convenient to make up a small amount of salad as a "side dish" for supper, by using up the left-over baked beans, to which have been added a good proportion of chopped raw onions, pickles and tomatoes.

156. *Dessert.* To many company commanders the word *dessert* is a synonym for luxury and useless and extravagant waste. As a matter of fact, the ration contains within itself

all the materials necessary for providing a dessert every day, and it is frequently one of the cheapest components of the meal. Almost anything in the shape of cheap cake, or rice pudding, bread puddings, plum duff, etc., will be greatly relished if a palatable sauce is provided; the sauce is to the dessert even more than the seasoning to other foods. The sauce may be as cheap, or as inexpensive, as the cook desires to make it, and the entire dessert need not cost but a fraction over one cent, or even less than one cent, per man though more expensive desserts should be provided as often as the funds will allow.

157. *One gallon of sauce may be regarded as sufficient for 25 men.* It can be made with three quarts of water, two pounds of sugar and one-fourth pint of vinegar, together with about four ounces of corn starch, or five ounces of flour, made into a batter. Or, it may be made richer and more finely flavored as follows: Add a one-pound can of evaporated milk in the place of one pint of water, the juice of a half-dozen lemons, or of four oranges, or other fruit juices, in the place of vinegar, one-half pound of butter, and after the sauce has cooled, one-half ounce of

extract. The mixture may be given a rich color by the addition of a small amount of caramelized sugar. The sauce may be prepared in a dozen different ways and still be very inexpensive. In addition to the puddings and sauces, excellent pies may be made from the articles forming a part of the issue ration. Even mince meat can be easily prepared from the articles sold as a part of the garrison ration, and the dried fruit put out in various forms. (See Pars. 116–120). A palatable dessert may be served every day while living on the straight ration or less.

CHAPTER V.

MILK, CHEESE, BUTTER, LARD, COMPOUNDS, ETC.

158. MILK. According to the standard adopted by the Department of Agriculture, Milk is the clean product obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within 15 days before and 10 days after calving, and containing not less than 8½ per cent. of solids (protein, sugar, and mineral matters) and in addition not less than 3¾ per cent. of fats. It contains about 87 or 88 per cent. of water.

159. There is no food that varies more in composition. For instance, the Holstein breed of cattle produces a milk with the minimum amount of fat, and the Jersey about double the amount. The composition of the milk of a single cow varies greatly from day to day on account of her method of feeding, and a more fixed quality of

milk is obtainable from the dairy milk of the herd than from any one particular animal.

160. While the milk coming from a perfectly healthy and clean cow may be regarded as sterile, we might very properly question the purity of milk that comes from cows that have not been subjected to the tuberculin test, and with whose care, attendance and milking we are not familiar.

161. *Disease germs* may be derived from the animal itself on account of being diseased, or from unclean surroundings or carelessness in handling the milk.

Germs, once finding their way into milk, multiply with great rapidity. They are of two distinct classes, those that produce or promote souring, and disease germs. The former are said to be harmless unless in such quantities as to produce diarrhea, but owing to their presence milk cannot be kept for any great length of time without souring.

162. Among the diseases known to have been conveyed by milk are diptheria, typhoid, tuberculosis and perhaps scarlatina and cholera.

These germs are, however, more easily destroyed than the first class, and by a very simple process.

163. *Pasteurized Milk.* This is milk that has been kept at a temperature somewhat below the boiling point—about 158 degrees Fahr.—for 20 to 30 minutes. This process is such as to destroy most of the disease germs that may be present though it will not keep the milk from spoiling for more than 2 or 3 days, ulness kept below 55 degrees Fahr. Pasteurized milk is almost as digestible as raw milk, but it deteriorates rapidly and should be used as soon as possible.

164. *Boiled Milk.* The most satisfactory method of procedure is perhaps to boil the milk for a few minutes, cool quickly and strain. This does not alter the taste greatly, but if boiled for any great length of time it loses its natural flavor and is rendered more indigestible.

165. *Powdered or Desiccated Milk.* This is produced by passing a thin sheet of milk between two heated rollers in such a way as to desiccate it immediately. It is then broken up into a fine soluble powder and only requires the addition of water to bring it back to the condition of natural milk again. This powdered form of

milk contains all of the solids of the original milk in a sterile and soluble form and there can be no doubt but that desiccated milk will come into large use in the near future.

166. *Evaporated Milk* is produced by evaporating a considerable portion of the water in milk. It contains not less than 28 per cent. of solids. The term *Evaporated Cream* is no longer in use, but was formerly applied to what is now known in the trade as evaporated milk.

167. *Condensed Milk* is the same as evaporated milk, with about 40 per cent. of cane sugar added.

168. *Skimmed Milk* is milk from which a portion of the fat has been removed. If the cream has been removed by the natural process of allowing it to rise, a considerable amount of fat still remains in the milk. If the cream is removed by means of a separator, little fat remains, and such milk should be termed "Separator Milk." The chief prejudice against skimmed milk arises from the reason that it is frequently disposed of as "whole milk," that is, milk from which the cream has not been extracted. It is still a valuable food—lacking only fat, and this may be

abundantly supplied by other foods. Skimmed milk is used in great quantities as food for pigs and poultry.

169. *Sterilized Milk* is milk that has been heated to the temperature of boiling water or higher for a length of time (say 20 minutes) sufficient to kill all organisms present.

170. *Cream* is that portion of milk, rich in fat, that rises to the surface of milk on standing, or separated from it by centrifugal force. It contains not less than 18 per cent. of milk fat.

171. *Double Cream* is a term applied to the thick cream that is drawn from a Separator running at a low rate of speed, in distinction from that extracted when the Separator is run at full speed.

172. *Buttermilk* is the product that remains after the butter is removed from the milk or cream during the process of churning.

173. CHEESE is regarded as one of the oldest forms of food prepared for the use of man. The term is applied to the solid product produced from milk by coagulation of the casein with *rennet* (a ferment generally prepared from the fourth stomach of calves) or with *lactic* acid and

subjecting the solid product thus produced to a process of fermentation and ripening by the addition of appropriate seasoning material, seasoning and subjecting to storing at a convenient temperature for different lengths of time. The ferments introduced produce certain changes in the material and develop an aroma and flavor more or less agreeable to the smell and taste.

174. *Full Cream Cheese* is made from milk containing its full complement of cream.

175. *Cream Cheese* may contain any qauntity of cream, but generally has less than the so-called, "Full Cream Cheese."

176. *Swiss Cheese* is the term applied to any hard, tough cheese in which are found a large number of holes. When cut it makes a leathery, flexible slice and has more or less of the flavor of the genuine Swiss Cheese.

177. *Filled Cheese* is a term applied to cheese in which the place of the natural milk fat is taken by fat from some other source. *Neutral Lard* is used frequently in this connection. Filled Cheese is a poor imitation for the reason that the same aroma and flavor cannot be developed as in cheese containing the natural milk fat.

178. *Cottage Cheese* is a nutritious and palatable product of home manufacturer, and is not suitable for keeping or transporation. It is generally made from sour milk in which the casein has coagulated by the natural formation of lactic acid. The sour milk is placed in a muslin bag and the whey separated by gravitation, or forced out by pressure. It is then salted to taste, and often cream is added to make it more nutritious and wholesome.

179. *Limburger Cheese* is made from pure milk, or that from which a portion of the cream has been removed. The peculiar flavor and smell are developed largely as a result of keeping it stored for a period of about 6 weeks in atmosphere saturated with moisture and at a low temperature.

180. *Edam Cheese* is a hard, highly colored Cream Cheese, often covered with paraffin, manufactured at a small town called Edam near Amsterdam, Holland.

181. *Roquefort Cheese* is a foreign cheese made from ewe's milk.

182. *Cheese has about twice the nutritive value of an equal weight of fresh meat.* On account of the

amount of fat present, it is considered rather difficult of digestion for weak stomachs. The harder forms being more completely broken up in the mouth are the more digestible. It is probable that on account of the active ferments present a small quantity of cheese taken at the end of a meal actually assists in the digestion of the food already taken although more or less difficult of digestion itself.

183. FATS AND OILS. *All fats* consist essentially of two distinct elements; *olein* and *stearin*. The former consist of the oily part that may be pressed out at a moderate temperature, while the *stearin* is the part that remains and liquifies only at a relatively high temperature. Both serve important but entirely different purposes in the preparation of the various *compounds* put on the market as substitutes for lard and butter.

184. The *olein* and *stearin* are separated from suet and beef fat as follows: The fat is melted and allowed to cool. Crystals of stearin quickly form and the fat is spread in flat, rectangular slabs and wrapped in a cheese cloth of fine quality. These slabs are stacked in a pile several

layers high and gradually subjected to great pressure. The oil (olein) oozes out, and finally the stearin is left in light, cream colored waxlike cakes that are brittle and easily broken in the fingers.

185. *The oil thus extracted* retains its liquid form at a moderate temperature and may be used for illuminating or lubricating purposes; or, it may be used in the various lard or butter compounds put up by the packing houses. The stearin melts only at a relatively high temperature, thus giving body to the fat, lard, tallow, etc., the quantity present determining the consistency of the article. By ingenious combinations advantage is taken of the properties mentioned and lard and butter compounds are manufactured to meet the various demands of climate and season.

186. *Beef fat has a higher melting point than lard*, and beef stearin than lard stearin. In the manufacture of artificial butter, we find the beef stearin combined with *neutral lard*, and the lard stearin with *oleo oil*, which is the oil pressed from beef fat.

187. *Tallow* is simply beef or mutton fat rendered at a very high temperature to give a higher melting point.

188. OLIVE OIL is by far the most important of edible oils, both on account of its abundance and palatability, and it would be more commonly used in ordinary cooking except for the cost. It has been used since the earliest historical times and was probably one of the first vegetable oils manufactured. By reason of its great value and high price it has been subject to systematic and extensive adulteration. Nearly all of the edible oils have the light amber tint that is characteristic of many grades of olive oil, and if mixed with them to such an extent that not more than 30 per cent. of the olive oil remains, the detection of adulteration may be extremely difficult.

189. COTTONSEED OIL stands next to olive oil in importance as an edible oil. The immense quantity consumed can be best appreciated by the fact that for every pound of cotton fiber grown there are two pounds of seed available for making oil, and the greater part of it is used for edible purposes.

190. The oil was formerly objected to on account of the disagreeable odor given off in

cooking, and for a bad flavor in the article cooked. Within the past few years these objections have been removed, and now an oil is placed on the market that is practically odorless and tasteless, and immense quantities are used in cooking and baking.

191. As in animal fats, there is a large portion called stearin, that melts at only relatively high temperatures, advantage of which is taken in producing oil for summer or winter use. In the former the stearin is left in the oil which will retain its liquid condition during the warm summer months; but for winter use, the oil is chilled and the stearin separated by filtration. The oil remaining retains its liquid form at relatively low temperatures.

192. BUTTER. As defined by the Department of Agriculture, butter is a food product made exclusively from milk or cream or both, with or without the addition of common salt, and with or without the addition of coloring matter. It is the most easily digested of all fatty foods. The cream from which it is derived consists essentially of the fat of milk although other substances (water, sugar, etc.) are present in con-

siderable quantities. The globules of fat constituting the cream are lighter than the milk and are separated from it either by allowing it to rise to the surface, or by means of a separator in which the separation is made by centrifugal force. In the latter the cream comes to the center and is allowed to flow off in tanks provided.

193. If desease germs are suspected, the cream may be *pasteurized* before churning (by subjecting it to a temperature of about 158 degrees Fahr., for about 30 minutes) but butter made from such cream is devoid of natural flavor.

194. *Ladled Butter* is made by remixing and reworking different lots of butter without melting, so as to secure a uniform grade.

195. *Canned Butter* is ordinarily put up when perfectly fresh in cans weighing from ½ to 3 pounds. The cans are completely filled and hermetically sealed. In this condition it will retain its good quality for several months. It can however be kept indefinitely by melting, boiling to drive off the water, straining to remove the casein and sealing hermetically as before.

196. *Renovated Butter* is of two distinct classes:

(*a*) The product obtained by melting together and refining several different grades or lots of different color without the addition of any foreign matter, the object being to secure a high grade uniform product.

(*b*) Reworked butter that has been impaired in quality and has been subjected to melting or other renovating process.

197. *Oleomargarin* is the term applied by the Department of Agriculture to all butter substitutes placed on the market regardless of their composition. In its manufacture the oil is churned with a certain amount of milk, or cream, or with both or with creamery butter, in order to secure the desired flavor. The amount of stearin added is determined by the climate in which the butter is to be used or by season of the year.

198. LARD. Lard is defined as the fat of swine. From the several parts of the carcass distinct grades are obtained, differing slightly in chemical composition and ability to withstand heat without passing into a liquid form. Thus the part that forms in large leaves, and lines the back of the hog, and is called "*Leaf Lard*," is the

best and most expensive. The *intestinal lard*, found within the abdomen and attached to the intestines, is also a very high grade of lard. The "Back Fat" is next and constitutes the greater part of the lard placed on the market. "Silver Leaf Brand" and "Shield Brand" are among the names under which it is sold, although these brands contain no "leaf lard" at all. Lower grades are found in the feet and other parts of the hog, but this is not rendered into cooking lard. In the packing houses the fat of diseased hogs that die in human food is rendered into soap grease, lubricating oils, fertilizers, etc.

199. *The proportion of stearin in lard* determines its melting point. Lard with a high melting point is specially desired for summer use, and that with a low melting point for cold climates and for winter use. The melting point may be regulated by increasing or reducing the amount of stearin used, though any change in the natural proportion must be considered as an adulteration.

200. *Neutral Lard* is made from the "leaf lard," being that portion that is rendered at a relatively low temperature, so that it may be entirely free from a steam taste. It is practically

free from moisture and acids and hence its name. It is used largely in the manufacture of oleomargarin of the best quality.

201. *Leaf Lard* consists properly of all the lard from the leaf, but there is relatively little of this placed on the market. It demands a high price and few can afford to use it.

202. *Noodle Lard* is made from the hog backs. The lard is ground and rendered at a low temperature and used in the manufacture of artificial butter.

203. *Prime Steam Lard* is made from fat from all parts of the carcass and rendered by the application of live steam. It practically represents the average fat from the whole animal.

204. *Kettle Rendered Lard* consists of part *leaf lard* and *back fat* only and as a rule is a higher grade than the steam rendered lard. The two grades—Prime Steam Lard and Kettle Rendered Lard—constitute the greater portion of the pure lard placed on the market.

205. *Adulteration.* Beef fat has a higher melting point than lard, and cotton seed oil a much lower and by a happy combination a compound containing no lard at all can be formed

having the same melting point as any grade of lard. The principal adulteration to which lard has been subjected has been by the addition of such a compound of the same melting point. The law now forbids its sale on the market as *lard*, or without giving its composition.

206. *The Lard Compounds* consist very largely of cottonseed oil to which stearin is added to give a body and to raise the melting point. Some of these compounds contain as high as 75 per cent. of cotton seed oil and 25 per cent. of stearin, and are placed on the market at a lower price, furnishing an excellent substitute at a reasonable price. For some purposes these substitutes are almost as good as pure lard, but in pastries about one-fifth more has to be used to secure the same result, and for this reason, economy does not always result from its use.

207. *The Objections* raised to the use of artificial butter and the so-called lard compounds are more on the grounds of fraud and deception than of nutritive value. The compounds are wholesome and digestible. Artificial butter differs from creamery butter principally by the absence of certain acids. In the lard compounds

a pure vegetable oil has been substituted (at least in part) for the animal oil which has been removed.

208. Practically all fats are the same and do the same work in the system, though their flavor and appearance have much to do with our estimation of their value as foods. We cannot consistently object to the use of artificial butter on the ground that it contains animal fat, for we eat quantities of that every day. The objection naturally arises from doubt as to cleanliness in manufacture and as to the actual composition.

209. A personal inspection of the packing house methods of today would satisfy the most skeptical that artificial butter is made from clean animal fats and that it is put up under far more sanitary conditions than generally exist in the country dairy or in the creamery. In addition, the danger from tubercular germs which are known to frequently exist in butter is practically done away with.

211. The cheapness and excellent quality of artificial butter found on the market recommends its use in the company kitchen, though the tax of 10 cents per pound imposed on that which is colored should exclude that particular article.

CHAPTER VI.

PRESERVATION OF FOOD — BACTERIA AND MOLD.

BACTERIA.

212. *General Remarks.* It may be said that the deterioration of foods through puterfaction, decay, souring, etc., is due to the growth of bacteria* and that *preservation* requires conditions unfavorable to such growth. Thus, a certain amount of moisture—35 per cent, to 40 per cent. —is required for the growth of bacteria, and generally the lower the temperature until the freezing point is reached, the slower will such growth take place. Hence *dryness* and *cold* re-

*Bacteria, yeasts and molds comprise a series of plants commonly known as micro-organisms, or more popularly as microbes. The general rotting of fruit, decay of meat, souring of milk, and similar phenomena are incident to the growth of such plants. **Molds** are fungi of considerable size, easily visible to the naked eye and of thread-like formation. **Yeasts** develop by a process of **budding,** each little cell being said to reproduce itself every three or four hours. **Bacteria** are smaller plants that multiply by a process of **splitting** into rod-like or spiral bodies.

tard decay, but absolute prevention of deterioration requires that all bacteria present be killed and that others be prevented from coming in contact with the food. To kill the bacteria requires a sufficiently high temperature to materially alter the flavor of the food, or even cook it, and germs cannot readily be killedin any otherway without spoiling the food.

As bacteria are found everywhere in the air, water, or earth, it is not always easy to keep them from food, even after they have been gotten rid of. It thus appears that freshly cooked food in general is apt to be freer from bacteria than food that has not been cooked, or that has not been properly portected if "left over" for some subsequent meal.

213. *Presence of bacteria not always undesirable.* Comparatively few bacteria are harmful and some are not even undesirable. For instance, *alcohol* and *vinegar* are direct results of bacterial growth, while the flavors of *butter* and *cheese* are largely due to the growth of bacteria. *Sauerkraut* is a wholesome food which derives its characteristic flavor from partial decomposition of the cabbage incident to fermentation during the process of curing. The *souring*

of milk is a natural process due to the growth of certain germs in the milk and it is doubtful whether the wholesomeness of the milk is thereby impaired, though it becomes less palatable. If not permitted to sour, certain putrefactive changes would soon take place, producing a more or less dangerous product. However, it is generally desirable to retard the growth of bacteria in order to preserve our food products from decay and this can be done in various ways.

214. *Drying.* It has already been noted that a considerable amount of moisture is necessary for bacterial growth (Par. 212); hence the absence of moisture will check it. For example, in nature, *grains* dry out and are thus preserved as seed for the subsequent year, and incidentally *flour* containing moisture to the extent ordinarily found in wheat is free from bacterial growth. *Meats* stripped from carcasses of slaughtered animals and dried in the sun will keep for almost indefinite periods. *Fruits* dried in the sun, or by artificial means, are free from decay so long as they are kept dry. *Crackers*, which contain practically no moisture, keep indefinitely so long as they are perfectly dry; while *fresh bread*, which contains a certain amount of moisture will

spoil in days, or weeks, depending upon the amount of moisture contained in it, and in the atmosphere where stored. Dried or toasted *bread crumbs* keep indefinitely in a perfectly dry atmosphere, if protected from mice and insects. They should be suspended in a clean flour sack until used. The preparation of *milk* for preservation for indefinite periods is a powdered condition, and the desiccation of *eggs* are growing industries.

Fresh Meat hung in a moderately cool dry place—say 60 degrees Fahr.—will keep longer than in a damp ice box at 50 or even 40 degrees Fahr., a fact that can frequently be put to use in company kitchens. At the Training School, meat is seldom hung in an ice box, even in summer, but is protected from flies by cloths, and hung in a moderately cool place, in a draught if practicable.

Dried fish, ham, bacon, dried beef, etc., are samples of meats preserved by dryness, though the brine in which they may have been cured, the smoke from burning wood, and additional salt have all assisted in their preservation.

Most vegetables and *fruits* are now preserved by desiccating either by the application of heat, which drives off the volatile oils, that give

fruits their peculiar flavor, or by a more recent process of passing air from which moisture has been extracted, over the surface of the same. It is claimed for this latter process that the natural flavors are retained, and actual experience has shown it to be the case in many vegetables and fruits.

215. *Cold Storage.* As bacterial growth is checked by low temperatures, cold storage affords a ready means of temporary preservation of foods for periods depending upon the temperature used. Generally, however, all products that have been long in cold storage quickly deteriorate when removed therefrom and hence should be consumed as soon thereafter as practicable. In the Artic regions steaks from the mammoth thousands of years in the ice are said to have been eaten with relish. As a rule, beef, is "aged" at temperatures somewhat above freezing, for weeks before it is considered to be of sufficiently fine flavor for high class trade.

216. *Storing in Pits.* Should it be desirable to keep apples or vegetables far into the winter and suitable cold storage is not available, excellent results may be secured by covering such

products in the earth. Dig pits of suitable size—say three feet deep and about four feet wide and of a length required for the quantity to be stored. Let the ground *chill thoroughly* close to the freezing point, and meanwhile keep the apples, etc., in the vicinity covered with hay. While the temperature is nearly down to freezing, line the pit with hay and carefully lay away the apples, etc., without bruising, and gradually cover with hay as the weather gets colder. Finally, lay boards or timbers over the pit and cover well with hay and earth, leaving a small flue for ventilation. If cared for in this manner, apples, cabbage, etc., can be kept for several months with but slight loss.

It is practically impossible to keep other vegetables than sweet potatoes for long periods, in the steam heated basements of modern barracks. Sweet potatoes keep best at a temperature of 70 degrees Fahr., and should be covered with sand if practicable.

217. *Other means for preserving food products.* A cool, dry cellar comes next to cold storage. Its value, however, depends upon *uniform temperature* and a *dry* atmosphere. Un-

slacked lime may have to be resorted to to preserve dryness, and ventilation is always a necessity.

The *fireless cooker principle* can often be resorted to for the preservation of foods that have already been chilled. Compressed yeast (not dried, but well chilled) have been kept for nine days in excellent condition, simply by wrapping in a number of layers of coarse paper, and then setting in a temperature of 70 to 90 degrees Fahr. *Moist sacks* placed around receptacles containing food, or *solid damp earth* packed about the same, cold springs, etc., have often been resorted to for the preservation of milk, butter, eggs, etc.

218. *Chemical Preservatives.* Before the passage of the Pure Food and Drug Act, many "preservatives" were used to prevent bacterial growth. Such, for instance, were *borax*, *benzoic acid*, *salicylic acid*, and *formalin*, and while acting as antiseptics, were practically harmless so long as taken in small quantities. They were sold under the head of *preservatives*, *antifermentine*, *freezine*, *etc.*, and were frequently used in the home. The principal difficulty seems to have been to determine how many parties had

added the preservative as it passed from the manufacturer, through dealers, to the consumer. Due to the Pure Food Law making the use of such preservatives illegal, the food on our market is now practically free from them, although *benzoic acid* is still allowed in certain foods.

219. *Non-Poisonous Preservatives.* Some materials in common use for preserving purposes are not only harmless, but actually beneficial.

(a) *Sugar* has an exceedingly high nutritive value and is a natural preservative when used in sufficient quantities, *i. e.*, in quantities frequently as high as 40 to 50 per cent. Its use in the preparation of jellies, preserves, marmalades, etc., is almost universal. Fresh fish is sometimes rubbed with sugar, and condensed milk is preserved by the addition of 30 to 40 per cent. of it. Raisins, figs, currants and prunes are preserved partly with sugar, and partly through drying out.

The spread of the canning industry has however, reduced the use of sugar to a considerable extent.

(b) *Salt* is the most common form of harmless preservatives. Its use in connection with

fish, fat pork, beef, etc., is well known. With sugar and saltpetre, it is frequently used in a brine for corning meats, or curing them preparatory to other processes necessary in preparing them for the market. Salt is used to preserve as well as to flavor butter and cheese, and the latter is frequently rubbed with it to prevent bacterial growth.

(c) *Vinegar* is commonly used in the preparation and preservation of all kinds of pickles and in certain sausages and mince meats, etc. The acids formed in the souring of cabbage out of which sauerkraut is made preserves that product from the action of undesirable bacteria.

(d) *Spices* are recognized as more or less efficient as antiseptics. The preservation of mincemeat, sausage, salads, etc., is largely due to their presence, although they also add a desirable flavor. Such mixtures are, however, made most frequently in cold weather, when deterioration is more easily prevented.

220. *Canning.* By the above simple methods of preservation, foods lose their characteristic flavors; frequently they become much less digestible, and as a rule deterioration is only

delayed. The only way of securing perfect preservation is by killing all the bacteria present (and they are always present in raw foods), and then absolutely preventing their re-entrance. The first requirement is accomplished satisfactorily in many foods by boiling for certain periods, sometimes under pressure to produce such higher temperature as has been found necessary from experience. Thus, most fruits and vegetables, certain kinds of fish, and some sea foods are among the products that can be actually *cooked* to advantage for the purpose of preservation; but other foods, as raisins, currants, some cured meats, and cereals that are easily dried can neither be satisfactorily nor economically handled in this manner.

Having gotten rid of the bacteria, it is necessary to keep them out by hermetically sealing the receptacle in which the food is placed. In the case of jellies, melted paraffin is generally poured over the surface; in the household, glass jars with suitable tops and rubber bands, are used to advantage, although frequently the rubbers and covers are not sufficiently sterilized and serve to re-introduce bacteria. In the laboratory and

sometimes in the household small amounts of food are placed in glass bottles or small jars with mouths stopped with cotton, which is said to actually prevent the entrance of bacteria.

For the general trade, however, sealing in tin cans is resorted to almost to an incredible extent, and there seems to be no reason why the food hermetically sealed in them should not keep indefinitely. Generally, after the cans are filled and sealed, a puncture is made for the escape of steam when the cans are reheated. A drop of solder then closes the hole and frequently this work is done in a vacuum, in order that the air may be effectively withdrawn from the can before closing.

MOLDS.

221. *General Remarks.* Molds develop from spores found floating about in the air. These spores are slightly heavier than air, and gradually settle to the floor or light upon objects such as exposed foods, damp boards, leather goods, etc., where, according to the species, of which there are many, coarse or fine thread-like growths of various colors develop. Sweeping, dusting, or

simply passing through a room stirs up mold spores that have settled to rest, but the simple covering of food is frequently sufficient protection from them, though this would not protect from bacteria. The latter, however, require much moisture for their growth, while molds develop where but a small percentage may be present.

222. *Jelly*, in which the spores have been killed, is protected from mold by pouring melted paraffin over the top. In cooling, it effectually seals the surface against exposure to the air. A little alcohol, brandy, or white of eggs might be used in place of the paraffin, with a clean piece of paper cut to fit the glass pressed down upon the surface of the jelly.

223. *Sausage*, packed in a jar is frequently sealed by pouring melted lard over the surface. It forms a solid cake and prevents the entrance of molds. Even after such precautions, however, food should be set in a dry place, as absolute sealing is difficult, and mold will not develop where it is dry.

224. *Canned Goods* that have been opened and exposed to the air will surely mold in a few

days at most if subjected to conditions favorable to such growth. Boiling and resealing alone will again prevent them from spoiling.

225. *Almost any foods* found in our storerooms are subject to the growth of molds. Even pickles will support such growth, though the acid present would generally prevent the development of bacteria. Molds feed upon rich foods, and will not develop where minerals only are present. Their growth, however, may be luxuriant upon any vegetable product such as stumps, planks, and stalks of grain. In fact, the musty smell of hay, grain, or of the air in a close, damp room, is due to the growth of some species of mold.

226. *Effect of Mold Growth.* The presence of mold causes food to become unsightly. The flavor is impaired or ruined and a musty odor is frequently present. After much growth of mold the decay of food takes place on account of changes incident to its growth. Incidentally, bacteria growth is more than likely to have set up and in part caused the deterioration of the food.

227. *Mold Not Unwholesome.* Mold is not

considered as necessarily unwholesome, in itself in fact certain kinds of cheese, as Roquefort derive much of their flavor from the mold present. If consumed in large quantity, slightly poisionous effects may be produced. Molds not being necessarily unhealthful, foods in which they appear need not become a total loss, but the mold may be cut from portions of the ham, bacon, cheese, bread, fruits, etc., upon which it appears.

228. *Effect of Moisture.* Molds develop best in close, dark and slightly moist atmosphere, with a temperature anywhere between 40 to 100 degrees Fahr., different species growing best at different temperatures.

229. *Mold develops best* in cozy corners and close atmosphere, and hence where single pieces of bread or fruit, stored on a shelf, remain free from mold, a stack of bread, or a platter of fruit, will mold with facility. Many materials contain sufficient moisture within themselves to support the growth of molds, should the germs gain entrance; hence, precautions against the molding of such foods may simple *retard* their growth.

Mold starting in a barrel of apples quickly goes through the entire lot, or if a start is made in a bin of vegetables, the mold will quickly spread to all parts; hence, in storing they should be separated if practicable by papers, or sawdust, or divided into small lots.

230. From the principles applied, it will be seen that *mold can be effectulaly prevented only by placing food in dry atmosphere* and if the room be light and well ventilated, so much the better.

Remember, however, that foods just removed from -cold storage quickly condense moisture over their surfaces and for this reason may mold when similar articles that have not been chilled will not.

231. *Mold may be prevented* from spreading by wiping the individual articles such as apples, oranges, lemons, etc., as dry as possible, wrapping in dry paper, which of itself will absorb more mositure from the surface of the fruit, and then placing in a moderately dry atmosphere.

Almost all objects resulting from organic growth, such as cloth, and leather goods, as well

as food products, are subject to molding, and the only effectual remedy is storage in a dry place.

Especially in the tropics can much food and property be protected from mold by carefully wrapping in dry paper or storage in dry paper sacks.

CHAPTER VII.

BRIEF EXTRACTS FROM LECTURES BY THE AUTHOR.

232. * * * The efficiency of an organization commander is measured as well by the intelligent supervision he gives to the messing of his men as by any other standard. * * * *

233. * * * In the regular service, you will generally find the best men where you find the best mess. * * * *

234. * * * You can demand almost anything from a well-fed organization, and your orders will be cheerfully obeyed. Mental condition is largely regulated by the stomach. * * * *

235. * * * Remember that wars are waged by youths still in their teens, and not by bearded men, as is frequently painted by the masters of art. Our Civil War was fought by boys averaging

less than eighteen years—an age at which a well-balanced, well-prepared and liberal diet is still of special importance. * * * *

236. * * * As a rule, good mess officers are not born; they develop by study and experience. No officer will be successful in playing this role unless he studies this part of his duties as he would his tactics, his guard duty, or his firing regulation. * * * *

237. * * * The officer in charge of a mess is not expected to usurp the duties of the Mess Sergeant—whose efficiency is generally overestimated—but he should establish a simple system of checking the mess that will prevent a daily expenditure of supplies greater in value than the daily allowance. * * * *

238. * * * The mere presence of the mess officer in the dining room, and his active interest in seeing that the men get the best he can provide will improve the average mess 100 per cent. In any case, the improvement cannot be figured in dollars and cents. * * * *

239. * * * the value of food when served, depends upon the ability of the system to appropriate it to the needs of the body and the 4,000

and more heat units presumably stored up in the field ration, when chemically analyzed, quickly dwindle below the requisite 3,500 for a working man, when the rations are damaged in transit, wasted by the cooks, or are so poorly prepared that much is thrown away by the men as unfit to eat; or, if taken into the system, is largely rejected by the natural processes, on account of the improper preparation for the body's assimilation. * * * *

240. * * * *Refuse* is that portion of food which cannot, or should not, be taken, or, if taken into the system, is not readily assimilated; for example, shells, potato skins, and bone from which all the juices have been extracted. *Waste* is food that should have been served in some form and consumed, but which has been thrown away; for example, portions of fat trimmed from fresh or cooked meats, slices and crumbs of bread not taken on the men's plates, fresh bones, etc. *The ration is ample if unnecessary waste is prevented.* * * * *

241. * * * Variety in bills of fare, careful preparation of foods, palatable seasoning, prevention of waste, and good dining-room service are the requisite factors of a successful mess. * * * *

242. * * * The present cash value of the garrison ration, *i. e.*, of the food provided for one man for one day, is, at most posts, somewhat less than twenty-five cents. Many people think it impossible for the soldier to be well fed on this small amount, while others assume that he lives on hash and stews, supplemented by purchases made at the Exchange from his own pocket. Such persons have not considered the additional expenses of feeding the soldier that must be taken into account. For the sake of comparison with the cost of living in a restaurant in civil life, let us take the cash value (or first cost) of the soldier's ration; add a resonable amount to the wholesale price, at which the ration was purchased, add the cost of transportation from the place of purchase to the Army Post; allow suitable wages for the cooks, dish-washers, waiters, cashier, and general manager; and to this add the cost of fuel, lights, rent, breakage, general upkeep of equipment; and then a suitable profit for the business, and you will suddenly find that the soldier's mess might better be compared with a restaurant where the charges are

about 75 or 80 cents per day, or at least $18.00 to $20.00 per month * * * *

243. * * * Though savings, as such, are no longer made (See Pars. 1–5, Mess Sergeant's Handbook) the history of their development and use is still of interest, inasmuch as the cash credit accruing from any component should, in general, be used for the purchase of other articles of the same class. The making of savings sprang up back in the 30's, when the coffee and sugar components were substituted for the liquor then issued. The regulations provided that when the issue of coffee and sugar was not actually made, its equivalent in money should be paid. The scope of the savings clause gradually spread to other articles, until 1908, when a saving was authorized on all of the components of the ration. The object of the saving has not generally been well understood nor appreciated; too often, it has been presumed that savings were made only with a view to purchasing luxuries for the table, and this idea seems to be the one firmly imbeded in the minds of many of our Congressmen who have suggested making a reduction in the ration, inasmuch as the quantities authorized seemed

to be above the requirements since savings could be made and spent for luxuries. Nothing could be farther from the truth. For example, take the flour ration: Eighteen ounces is the ration of bread or flour. A well fed organization will not generally spend more than from one-half to two-thirds of the cash credit accruing from the flour component for bread, and hence the accumulation of a considerable saving on this component of the ration should result. Now, our records at the Training School show that almost the entire saving is spent for flour, and the other necessary ingredients with which to make rolls, buns, coffee cake, batter cakes, desserts, etc., and that the net saving—about one-tenth— is insufficient to purchase more than one-half of the oatmeal or other cereal, served for breakfast, but not provided as a part of the ration.

Next in order comes the meat component. At this station, we make an enormous saving on beef, fully two-fifths of the issue, and why? Not to buy luxuries, but to vary the monotony of a steady beef diet by providing each day something different—sausage, liver, fish, beef hearts, chicken, eggs, macroni and cheese, etc., none of which

are a regular issue. (See Par. 8, Mess Sergeant's Handbook). Later I will explain the handling of this component in detail to show that there is economy in making such a saving and spending it to provide variety, but not for the purchase of luxuries for the mess.

In the same manner, we may go on with the other articles of the ration, and show that a saving of the cash credit accruing from the potato component enables us to purchase cabbage, turnips, carrots, parsnips, and sweet potatoes, but that if such a saving and purchase were not made, the authorized issue of the components would from necessity be almost entirely consumed. The same may be said of the dried fruit, making purchase of fresh fruit when in season and reasonable; of issue beans, purchasing lima beans, chili beans, dried sweet corn, pease; of coffee to purchase cocoa, or lemon for use with cold tea; of seasonings to purchase red peppers, herbs, etc., and in general, it may be said that the saving on any component is used to purchase articles of the same class, but here and there a little saving for general purposes is made. Where luxuries are provided, it is generally through unusual economy that has been exercised and good

judgment shown in purchasing certain delicacies at moderate prices.

244. * * * Beef is the most important and expensive article of the ration, generally from one-third to one-half its value; therefore, a saving creates a substantial fund upon which to draw for other purchases; while an over-draft rapidly consumes any savings or money allowance. On the other hand, flour is the cheapest component of the ration (nutritive value and general usefulness considered) and the more of it used the less will be the running expense of the mess. These two articles (meat and bread) always constitute more than one-half the value of the ration and the allowance of both must be carefully checked and not handled by irresponsible men. It is noted that when the ration is drawn, the lesser part (consisting of the smaller articles of the ration) is generally carefully checked by the mess sergeant or company commander, but frequently no accurate record is kept in the company of the bread and meat issued from day to day. We are still penny wise and pound foolish. * * * *

245. * * * If the cooks are unfamiliar with

handling the ration, do not allow them to touch more than the allowance (as determined by the cash credit) for the day, for if they do, the food will be wasted and the command will go hungry before the expiration of the ration period. * * * *

246. * * * Perishable articles must be carefully preserved and frequently must be consumed before others, in order to prevent deterioration and loss. * * * *

247. Unnecessary waste must be prevented by the careful prepartion and service of suitable quantities of food. Potatoes must be peeled thin or not at all, and the bread served in thin slices in small quantities as required. Hundreds of pounds of bread were formerly wasted each day on the Army Transports, where it was issued in huge chunks instead of thin slices. Untouched food left over from each meal must not be thrown away, but should be carefully preserved and used in the preparation of some palatable dish for a later meal.

248. * * * Gravy boats and sirup jugs should not have their contents dripping over the edges, and on the floor, nor should the meat and vege-

tables be simply thrown on the dishes on which they are served. It takes but a moment to arrange the platters of food attractively, and to wipe off the edges of the dishes so that they may be set on the table in an appetizing form. Soup should be served in tureens in a course by itself, with croutons, or crackers, and the remainder of the meal should not be brought on until the first course is finished. * * * *

249. When soup is served, coffee or tea need not be. The allowance of coffee is sufficient for making good coffee but twice daily, *i. e.*, coffee made with four and one-half ounces per gallon of water and one pint allowed to each man. Tea is cheaper than coffee and less harmful. It is coming into more general use. One-half ounces per gallon of water is the amount required, and it should not "draw" longer than eight minutes. Cocoa and chocolate may be served occasionally, using two ounces per gallon, but they are much more expensive than tea or coffffee.****

250. * * * The person best qualified to pass judgment upon the work of others is one who can, with his own hands, perform that work. An officer who can shoe a horse can criticise the

work of a horseshoer better than one who has simply observed such work. If he can make good bread, he is better qualified to supervise the work of bakeries than he otherwise would be. If he understands the *essential principles* of cooking, he will be able to render valuable assistance to many a good cook who falls short of being a chef through lack of just such technical knowledge. * * * *

CHAPTER VIII.

DEFINITIONS.

251. AERATED BREAD. Bread resulting from the dough into which carbonic gas is mechanically introduced, in order to save the starch, which is otherwise lost as a result of yeast fermentation.

252. ALBUMEN. The transparent, nitrogenous substance which forms the chief and characteristic constituent of the white of an egg. Albumen is found also in the blood and in all serous fluids; also in many animal and vegetable juices and solids.

253. ALLSPICE. A common spice (the berry of a West Indian tree) used in mince meat, brown cakes, puddings, soups, game entrees, and gelatin jellies. Ground or whole, it is used in pickling pigs' feet, tripe, sweet pickles, etc. It is supposed to combine the flavor of cinnamon, nutmegs, and cloves; hence the name.

254. AMBERGRIS. Obtained from the sperm whale. Also found floating in large cakes in the Indian Ocean. It is much used in flavoring liquors, and in perfumes.

255. ANILINE. One of the many products of petroleum. The red shades are harmless, but the chemicals used in making the blue, green, yellow, and other colors, are injurious. Much used in highly colored confectionery.

256. ANISEED. A small seed used for flavoring. Resembles *caraway seed* or *celery* seed.

257. ANNATTO. Obtained from a tropical tree. Much used in coloring varnish, silk, cheese and butter.

258. ARROW ROOT. The starch of the root of a West Indian plant. It is very similar to *sage* and *tapioca*. It is frequently made into a gruel for the sick, but is little used in the company. So called from the reputed use of it by the natives to heal wounds from poisoned arrows.

259. BAKING. Cooking in a dry heat, as in a closed oven. See "Methods of Cooking."

260. BAKING POWDER. A mixture of a carbonate of soda and an acid re-agent (as Cream of Tartar, Phosphoric Acid or some form of Alum) together with a small quantity of starch or other material to keep the active agents better separated. The acid and the carbonate combine when mixed with water, liberating carbonic acid gas, which, in rising, forms in pockets or cells in the dough, making it light and spongy. Cold water or cold milk should be used in the mixture, which should be disturbed as little as possible after the baking powder has been added. The dough should be baked as soon as possible after prepared, or it should be set in a cool place until the oven is ready. The objection to the use of baking powder is that, as a result of the chemical reaction, certain solids are left in the bread, cake, etc., which are more or less injurious, but they produce no harmful results if used in limited quantities. The exclusive use of baking powder bread is impracticable as it turns against the stomach. Compare with *Yeast.*

261. BAKING TEMPERATURE. Generally stated as 385 degrees Fahr., though bread may safely be baked at a somewhat higher or lower

temperature, say between 300 and 450 degrees Fahr. Many other articles are baked at much lower temperatures.

262. BARBECUE. To roast or broil whole. Or, an entertainment for which the carcass of an animal, as a hog, is roasted or broiled whole.

263. BASIL. One of the standard pot herbs of the mint family. Much used in turtle soup.

264. BASTE. Sometimes to sprinkle, as with pepper or salt; generally, to dash or pour a liquid over with a spoon, as in the case of gravy or stock in baking or roasting.

265. BATTER. A thick liquid mixture of two or more materials beaten together to be used in cooking or baking.

266. BAY LEAVES. Leaves of the Cherry Laurel. Much used in soups and stews, and in pickling.

267. BEEF EXTRACT. This is really a concentrated beef stock, extracted by boiling beef under pressure. It contains very little nutritive matter—much less than is found in an equivalent

weight of beef. It is of especial value on account of the ease and speed with which it may become absorbed into the circulation. It holds an important place in the diet of the sick and convalescent.

268. BEEF JUICE. The liquid remaining in fresh beef after properly prepared for consumption, the blood having been removed. The juice may be removed by pressure, or by cutting into small pieces and placing in cold water. The juice having been drawn out, the water is evaporated. Much of the so-called beef juice on the market is said to be prepared from the blood of the slaughtered animal.

269. BEEF TEA. This is really unfiltered beef stock. Instead of constantly skimming the surface of the stock, the coagulated albumen is allowed to remain. It should be made of the best meat. One-half pound of good beef tea may be made from one pound of meat and one quart of water. It has little real nutritive value, but like beef extract, is a light stimulant.

270. BENCH. A molding table.

271. BISK (or BISQUE). A shell-fish soup.

272. BLANCH. To scald vegetables, nuts, etc., to remove the outside skins or hulls.

273. BLOOD HEAT. The normal temperature of the human body, 98 degrees Fahr.

274. BOILING. The conversion of a liquid into steam by the application of sufficient heat to cause ebullition, or disturbance of the surface. As applied to cooking, it is heating or cooking in a boiling liquid. (See "Methods of Cooking.")

Water *boils* at 212 degrees Fahr., at the sea level. It *simmers* when the bubbles break beneath the surface say 185 degrees Fahr. It is *scalding hot* at 150 degrees Fahr., or at a temperature such that the hand cannot be borne in it. *Salt water* boils at 224 degrees Fahr. Other solids, as for example sugar, also increase the boiling point of water. A solution having reached the boiling point, the temperature cannot be increased by any amount of additional heat, except under pressure, as would result from boiling in a closed vessel.

Lard smokes at 385 degrees Fahr., and boils at about 600 degrees Fahr. Hence, it is evident that grease, even if not at the smoking or boiling

point, may be much hotter than boiling water—a fact that should always be borne in mind in handling it and in cooking.

275. BOUILLON. A clear meat broth or soup in rich extractives.

276. BRAINS. The brains of most slaughtered animals are used for food and are considered a luxury. Calves' brains are considered the best, although there is but little difference, and all brains are generally sold under this name.

277. BRAISING. Method of combining the roasting and stewing of meat in a closed vessel with heat from both top and bottom, as in a Dutch Oven. It is one of the best methods of cooking tough, lean meat. If the kettle is placed in a slow oven, it requires little further attention.

278. BROILING. Properly speaking, it is cooking over red hot coals by direct exposure to the heat of an open fire, though the term is applied to cooking on an iron plate interposed between the fire and the article cooked. In broiling the fire should be clear and free from smoke. Charcoal is the best fuel to use. It is better to

broil before a fire than over it, in order to save the dripping grease and avoid the smoky flavor though the smoke from the fat itself is not as objectionable as that from coal or wood.

279. CALORIE. Quantity of heat required to raise on kilogram of water one degree C. This is the equivalent of 1.54 foot tons. Food values are expressed in calories, and the soldiers' daily ration exceeds 5,000.

280. CAPERS. Unopened buds of a trailing shrub grown in Southern Europe. Pickled and much used in sauces. Caper sauce is frequently served with mutton.

281. CARMEL. A sirup made from scorched sugar, used largely in coloring sauces, as well as for flavoring.

282. CARAWAY SEED. Seed of a garden herb. Grows like the seed of a carrot or parsnip. Used in various cakes and sweet crackers, in rye bread, and in liquors.

283. CARBOHYDRATES. Starches, sugars and the fibers of plants. It is principally a source of energy. The surplus is stored in the body as fat.

284. CASEIN. A proteid compound found principally in milk, of which it is the most important ingredient. When coagulated, it forms the principal ingredient in cheese.

285. CASINGS. A term applied to the intestines of all animals. They are used to receive sausage, bologna, etc. The hog's stomach is actually used as a receptacle for his head when it is converted in to head cheese.

286. CASSIA. Bark of a tree similar to Cinanmon. Cultivated in China. Also called Chinese Cinnamon.

287. CELERY SALT. Much used in salads and seasonings. Prepared by mixing ground celery seed and salt in the proportions in weight of two to one.

288. CENTIGRADE. Graded to a scale of 100. On the Centigrade thermometer scale, the freezing point of water is 0, and the boiling point 100.

289. CHERVIL. A garden herb much used in soups.

290. CHICORY. A perennial herb of the aster family, with heads of large bright blue

flowers, and dandelion-like roots. The roasted and pulverized root is used in adulterating coffee and as a substitute for it. If grains of coffee containing chicory are dropped into cold water, the chicory will settle at once and be followed by a cloudy streak.

291. CHILI. Red sweet pepper.

292. CHIVES. A kind of green onion. Tops are slender and pipe-like. Much used in soups and sauces.

293. CHOCOLATE. It is ground from the *cocoa bean* before any of the fat has been extracted. It contains about 35 per cent. of vegetable fat and 45 per cent. of cane sugar. Very nourishing.

294. CHOWDER. A dish of stewed fresh or salt fish, or clams, with vegetables and crackers added.

295. CHUTNEY. An East Indian sweet pickle.

296. CINNAMON. The inner bark of the cinnamon, or cassia, tree. Grown in Ceylon and used as a spice.

297. CITRON. Large coarse fruit of the lemon family. Used in mince meat and preserves.

298. CLOVES. Flower buds of the clove tree carefully picked and dried. Should always be purchased whole as they deteriorate rapidly when ground.

299. COCHINEAL. Coloring matter made from the dried bodies of small insects found in the Southwestern part of the United States, in Mexico, and in Central America. It is harmless.

300. COCOA. Similar to chocolate, but not as rich. It is ground from the *cocoa bean* after much of the fat has been pressed out.

301. COMINA. An herb found in the Southwestern part of the United States and in Mexico. Much used in seasoning soups and stews.

302. COMPOUND. A substitute for lard commonly used in bakeries; of about the following composition, 75 per cent. cottonseed oil, 25 per cent., beef stearin. The results obtained are about the same as when using lard, and its use in company kitchens is recommended for economy.

303. CONDIMENT. Something to give relish to the food and gratify the taste. General term for seasoning.

304. CRACKLINGS. The crisp residue of hog fat after the lard has been tried out. It may be used in hash, or corn bread, but is valuable only in proportion as the amount of fat that is left in it.

305. CRACKLING BREAD. Corn bread to which cracklings have been added.

306. CREAM BREAD. Bread baked in superheated steam, as when moisture is artificially introduced into an oven, or the bread baked under inverted pans, giving a very thin crust and a light color.

307. CROQUETTES. A mass of finely minced and seasoned meat, fish, rice or potatoes, etc., made into a ball or other regular shape, rolled in cracker crumbs and fried in deep lard until crisp.

308. CROUTONS. Cubes of toasted bread. Generally served with soup.

309. CRULLERS. Small cakes made from a sweet dough mixture and fried in deep lard.

They may be made with either baking powder or yeast.

310. CRUMB. The soft inner part of the loaf, as distinguished from the crust.

311. CURRY POWDER. A yellow powder formed by a mixture of numerous hot pepper and ginger. Used as a high seasoning for stews, etc.

312. CUTLETS. Term usually applied to the rib cuts of pork, mutton, lamb, veal, venison, etc., but not of beef.

313. DEVILLED. Highly seasoned.

314. DEVILLED MEAT. Cooked meats finely ground and highly seasoned.

315. DOUGH. Technically, the mixture resulting from breaking up the sponge and adding the remainder of the flour and other ingredients to be used in making the bread. The term is also applied to the resulting mixture in any subsequent stage, and sometimes to any mixture in which flour forms the greater part.

Young or *Green Dough.* One not fully matured, or not yet risen to the maximum height to which it will prove.

Ripe Dough. One that has fully matured.

Old or *Rotten Dough.* One that has been allowed to stand longer than the normal length of time, so that it begins to show signs of sourness. In pulling a portion from the general mass, it wil tear more readily than usual, on account of the gluten having become weakened by the action of acids upon it.

Sour Dough. Generally, one containing a large percentage of acid, on account of being allowed to ferment without the introduction of yeast. A *sour dough* may also result from unclean utensils, from proving in too high a temperature, from too long fermentation, or from yeast containing acid germs.

316. DOUGH-BREAK. A dough kneading machine with corrugated rollers.

317. DOUGHNUTS. Small cakes made from a dough mixture, and fried in deep lard. They may be made with either baking powder or yeast.

318. DREDGE. To sprinkle, as with pepper and salt, or rub in as with flour, etc.

319. DUMPLINGS. Pieces of dough, some-

times with fruit or vegetables enclosed, boiled or baked. If served with meats or stews, the pieces of dough should be dropped into the boiling hot beef stock or stew about eight minutes before being served.

320. EGGS. For domestic purposes, eggs should be kept in a cool, dark place—the nearer to the freezing point the better. However, changes are constantly taking place within the egg, producing a certain amount of heat, and partly for this reason, eggs will stand a temperature somewhat lower than freezing.

The porous nature of the shell facilitates decomposition, and eggs dipped in varnish, or other solution (*e. g.*, silicate of soda), that will permanently fill the pores will keep much longer than others. Even "cold storage eggs" should not be kept longer than six weeks. They are, however, often kept for a period of six months, or even more, but during this time they acquire a distinctly unpleasant odor and flavor. Eggs kept for a long time in cold storage, or decayed in any way, are extremely injurious.

321. EGG PLANT. An egg shaped fruit with a dark, purple exterior, weighing from one

to three pounds. Raised in the South. Allied to the tomato.

322. ENTREE. Small meats made in various guises, with sauces and garnishings, between courses, or at the beginning of a dinner.

323. ESTRAGON or TARRAGON. A garden herb used to flavor vinegar, soups, sauces, etc.

324. EXTRACTIVES. The principal ingredient of beef extract, beef tea, etc. They act as stimulants and appetizers, but have little or no nutritive value.

325. FAHRENHEIT. The thermometer scale commonly used in the United States and Great Britian, on which 32 marks the freezing point of water, and 212 the boiling point.

326. FARINA. A fine flour or meal made from cereal grains or from the starch of vegetables. Some forms specially prepared for breakfast foods.

327. FENNEL. A garden plant much cultivated in England. Grows wild in Florida. Used to flavor mackerel and salmon.

328. FERMENT. A substance capable of producing yeast fermentation.

329. FILLET. A strip of lean meat without bone.

330. FILLET OF BEEF. The tenderloin muscle, which lies beneath the backbone in the hind quarter. It is easily detached, and is used in steaks, and less frequently in roasts.

331. FORCEMEAT. The various mixtures used to stuff fowl, fish, tomatoes, etc. Some force meats are composed of minced veal and bacon with herbs and seasonings, or pounded chicken breaded with bread crumbs, butter, yolks etc.

332. FILLET OF FOWL. The breast.

333. FILLET OF PORK OR MUTTON. strip from the shoulder to the hip on either side of the backbone.

334. FILLET OF RABBIT. Fleshy part of the back and legs.

335. FILLET OF VEAL. Pieces of the A round, generally larded, stuffed, boiled, and skewed into a round shape.

336. FRAPPE. A term given to water ices that have been only partly frozen. It is an iced drink and the name should not be given to a thick custar cream.

337. FRICASSE. A dish of meat, as of fowl, cut into pieces, fried until partially done and stewed in gravy.

338. FRIED CAKES. Domestic term for doughnuts or crullers. A general term also applied to batter cakes, potato cakes, etc.

339. FRITTERS. A small quantity of batter usually inclosing or containing some other substances and fried in deep lard, *e. g.*, corn fritters, apple fritters, etc.

340. GARLIC. A bulb like an onion, with a strong characteristic smell and pungent taste. A clove of garlic means one of the natural subdivisions of the bulb. A favorite condiment of the people of Southern Europe and of the Orient. It is much used in company cooking to "bring out" the flavor of other seasonings.

341. GARNISH. To decorate a dish with something to make it more attractive, such as

bordering salads with capers, parsley, beets or lemons.

342. GELATIN. Glutinous material obtained from animal tissues after long boiling. It readily dissolves in hot water, and forms a jelly upon cooling. While in the liquid state, it may be given any flavor desired. It makes an excellent cheap summer dessert. Easily digested and much used in the sick-room. Not of great nutritive value.

343. GEMS OR MUFFINS. Hot breads made from white flour, graham, or cornmeal, and baked in gem pans.

344. GERM. The earliest stage in the growth of an animal or plant. Also applied to minute organisms which do, or do not, cause disease.

345. GIBLETS. Liver, gizzard, heart, neck, feet, wings, etc., of poultry as used in pies, stews and sauces.

346. GINGER. The root of a reed-like plant. The common brown root is the natural state. *Jamaica Ginger* is made from the same

root from which the outer surface has been removed.

347. GLACE. Icing.

348. GLUCOSE. A cheap sugar that will not easily crystallize, or a cheap sirup that will not crystallize—very much like "Silver Drip" but much thicker. Glucose is often made by treating cornmeal with sulfuric acid. It is very wholesome.

349. GLUTEN. The muscle building element of wheat, rye and other grains. The strength of flour and the toughness and tenacity of dough are determined by the quantity of the gluten present.

350. GRAHAM FLOUR. Unbolted flour, or white flour mixed with bran and shorts, named from a Dr. Graham of Boston, who strongly advocated the use of unbolted flour.

351. GRILLED. Broiled.

352. GRITS. Grains, as of wheat or oats, coarsely ground.

353. GRUEL. Liquid food made by boiling meal or flour in water or milk.

354. HAM. Properly speaking, it is the thigh of an animal, but the "ham" of the hog is prepared from either the thigh or shoulder.

355. HAM BUTTS. Part of the hog corresponding very closely to the chuck of the beef. It is a portion of the shoulder directly above that used in preparing "shoulder hams."

356. HOMINY. Cracked Indian corn from which the outer husk has been removed.

357. HOPS are used in the preparation of yeast, not as a food for the yeast plant, but to prevent sourness.

358. ICE. A general term frequently applied to frozen creams, custards, and other desserts, as well as to water ices. The latter are fruit juices sweetened with sugar sirup and stirred while freezing.

359. ICING. Same as frosting. Generally speaking, made of the whites of eggs, with sugar and suitable flavoring, as lemon, vanilla, etc.

360. JAM. A preserve of fruit boiled with sugar and water.

361. JELLY. The juice of fruits or meats boiled to an elastic consistence. In making fruit jellies, sugar and suitable flavor is added.

362. KIDNEYS from all slaughtered animals are used in stews, etc. There is not any great demand for them in American markets, but great quantities are shipped abroad. Pigs' kidneys are considered the best.

363. LAMB CHOPS. The short ribs of lamb, with the attached flesh.

364. LARD. The fat of swine. It is frequently adulterated by the addition of a large proportion of cottonseed oil. Pure cottonseed oil, to which stearin is added, making a fairly good substitute. In addition, lard and cottonseed oil compounds are frequently further adulterated by the addition of water, the presence of which is noted by the crackling and sputtering when placed in the spider, or when a small lump is dropped into the fire.

Watered lard is unnaturally white. Good firm lard is the best for pastries, although refined oil and "lard compounds" will do for most purposes.

365. LARD, TO. To lard, means to introduce thin pieces of pork, ham or bacon, into meats deficient in fat, to improve their flavor.

366. LEAF LARD. This consists of the leaves of fat lining the back of the hog. It may be torn out without cutting. It is the best quality of lard and may be used in many instances without rendering, if desired. The next best quality of lard is that which is found connected with the intestines called "intestinal lard," and the third quality comes from the back of the hog.

367. LEAVEN. A piece of old dough used with new dough for the purpose of starting fermentation.

368. LEEK. A species of onion, but the leaves are flat instead of round. Much used in soups.

369. LENTILS. A variety of bean used in making soups.

370. LIGHTS. The lungs of slaughtered animals. Used to some extent in cheap sausages.

371. LIVER. Calves' liver is the best of

all slaughtered animals, and is considered a delicacy when served with bacon, in hotels and restaurants. Beef liver is the next best; then pig's liver. The liver of mutton is very dry and tasteless.

372. MACARONI. First prepared in Italy. A strong flour is made into a stiff dough, pressed into long tubes, and dried in the sun, or by slow heat. *Spaghetti* is of the same material, but is pressed into the form of long cords. *Vermicelli* is the same as fine cord spaghetti. *Noodles* are of about the same consistence.

373. MACE. The inner coating of the nutmeg. It is a good flavoring for meats and cream soups, puddings and sweets.

374. MALT. Barley or other grain that has been allowed to sprout, then dried at a low temperature and coarsely ground. Useful in making yeast, as it furnishes food for the yeast plant in the best form possible.

375. MARJORAM. A mint-like plant, particularly aromatic and fragrant. Much used in seasonings.

376. MARROW. The material filling the hollow of bones. The beef marrow found in the shin bone of cattle is an excellent fat. In packing houses, it is extracted and sold on the market for shortening.

377. MAYONNAISE. A sauce for salads. Prepared from the yolk of eggs, with mustard, olive oil, lemon, salt, etc., added.

378. MERINGUE. A kind of icing made from the whites of eggs, with sugar sprinkled over the top when ready for baking. The sugar being next to the heat, quickly turns a delicate brown and adds a rich appearance to the pie or other pastry in which used.

379. MINT. An aromatic herb used in cooking. *Mint Sauce.* Chopped green mint, vinegar and sugar mixed. Served with mutton, either hot or cold.

380. MOUSSE. Froth. Something light and spongy. Term applied both to meat preparations and ice cream.

381. MULLIGATAWNY. Curry soup (combination of two words from a foreign language, meaning pepper water.)

382. MUSTARD. Flour made of mixed black and white mustard seed, deprived of its oil and toned down with more or less meal.

383. NOODLES. Practically the same material as macaroni and spaghetti. (See Par. 372.)

384. NASTURTIUM. Well known garden plant. The green seeds are pickled as a substitute for capers.

385. NUTMEG. Kernel of the fruit of the nutmeg tree. Much used in desserts, etc. A native of the Moluccas.

386. OLEOMARGARIN. A term adopted by the Department of Agriculture to designate all kinds of *artificial butter*.

387. OKRA. A vegetable plant whose green pods are often used in soups, stews, etc. Also served as a vegetable.

388. OLEIN. Olein is that portion of oil or fat which gives it fluidity. Fat contains more of it than lard, and lard more than suet. Contrast with *stearin*.

389. OREGANO. An herb much used in seasoning soups and stews.

390. OSEILLE OR SORREL. A green herb used as greens and in soup.

391. OVEN COUNT. The "count" of an oven is determined by the number of seconds that the arm and hand, while at a normal temperature, may be introduced to their full extent, into the oven chamber and held continuously without withdrawal. It is reliable only in the case of a dry oven, as moisture has a tendency to scald the flesh and force a premature withdrawal. In a perfectly dry oven, twelve counts (seconds) is about right for baking in a brick or earthen oven. If even a small amount of moisture were present, the same temperature of the oven would be indicated by a smaller count, say eight or six.

To count seconds, repeat moderately slowly: 0-1,000, 1-1,000, 2-1,000, and the small numbers indicated will correspond very closely with the number of seconds.

392. OVEN, QUICK. One heated to a higher temperature than normal, say about 385 degrees Fahr. An oven of less than twelve counts.

393. OVEN, SLOW. One heated to less than the normal temperature for baking, say be-

low 385 degrees Fahr. An oven of more than about fifteen counts.

394. OYSTER PLANT. (Salsify.) A white root with the taste of an oyster. Best in the spring of the year after the frost is out of the ground. It is generally left in the ground over winter.

395. PANCREAS. A gland from near the stomach of slaughtered animals, used as a *sweetbread.*

396. PARBOIL. To cook partly by boiling.

397. PARSLEY. A green herb much used for garnishing and in flavoring soups, stews, croquettes, etc.

398. PARSNIPS. A creamy white root resembling the carrot in shape. Much used in stews and frequently served as a vegetable. Like the oyster plant, it is considered best when left in the ground over winter.

399. PATTIES. There are two distinct kinds of patties. First, a puff paste shell baked and afterward filled. Second, small pies made by lining patty pans with short paste, filling with

oysters, chicken, etc., covered with a top crust and baked.

400. PEPPER. The *white pepper* is made from the ripe seeds, and the black pepper from seeds picked before they are ripe. White pepper is much better for cooking purposes, as it does not show dark specks. Black pepper is preferred for flavoring, especially in dishes that are to be strained afterwards. Pepper is much subject to adulteration and whole pepper should be purchased and ground at home.

401. PEPPER, CAYENNE. Red pepper pods and seeds ground. Often adulterated with yellow cornmeal, mustard hulls, etc.

402. PICCALILLI. The same as chow-chow. Green tomatoes, onions, cucumbers, celery, etc., finely chopped with vinegar added and finely seasoned.

403. PISTACHIO. A pale greenish nut resembling the almond. Much used as a coloring matter for ice creams and confections. It has a fine flavor. A deeper green is obtained by the addition of spinach.

404. POACH. To cook in a small amount

of water or milk. A term generally applied to eggs.

405. PORRIDGE. A gruel.

406. PROTEIN. The muscle producing compound found in meats, eggs, cereals, etc.

407. PROVING. The gradual rising or expansion of a dough or sponge, due to the formation of carbonic gas incident to the growth of the yeast plant.

408. PYROMETER. An instrument for measuring high degrees of heat, usually operated by the expansion or contraction of a metal spring. In our experience, they are not as accurate as the mercurial thermometers, and easily get out of order.

409. RAGOUT. A highly seasoned meat stew. Liquor is frequently added.

410. RENDERING. The process of separating the lard, or beef fat, from the tissue in which it is found.

411. ROASTING. Cooking before an open fire. Term also applied to baking in a dry oven chamber, with free circulation. Certain flavors are developed in roasting before an open fire that

are closely approximated in a well-ventilated oven, but not approached in a closed oven.

412. SACCHARIN. A white, sweetening substance (powder) obtained from coal tar and said to possess 300 times the sweetening power of sugar. It possesses certain antiseptic qualities and is a powerful anti-ferment. It contains no nutriment and is little used as a seasoning. Formerly used in tablet form with the Army standard emergency ration for sweetening coffee.

413. SAFFRON. The petals of a flowering plant. Made into a tea and added to the dough, or stew, etc.

414. SAGE. A plant with grayish green leaves and much used in seasoning meats and stews.

415. SAGO. It is made from the pith of a palm tree which grows in the East Indies. It is nearly pure starch and has many imitations on the market, but the form of the grain of the latter disappears in cooking. It is cooked in the same way as tapioca and is also much used in soups.

416. SALSIFY. See Par. 394.

417. SAUSAGE. There are from fifty to sixty different kinds of sausage put up in the packing houses, the components, quality and seasoning differing to meet the requirements of foreign and domestic trade. In the course of preparation, they are generally subjected to the smoke from hickory or other hard wood, and then cooked in vats of water, at a temperature of about 160 degrees, from ten minutes for *frankfurters* to three hours for *bung sausages*.

Summer sausages are first smoked and then placed in a drying temperature for about three months. The material put into suasages compares favorably with that put on the market in other forms.

Bull meat is used to considerable extent, as it takes up more moisture than other meats.

The best *pork sausage* contains no beef.

Liver sausage is one of the cheapest and contains lungs (lights) as well as liver and other ingredients not put into better grades.

A good quality may contain from one-third to one-half of beef, and for Army Sausage, this is an ordinary proportion.

418. SAUTE. To fry in a shallow pan

with but little fat—first on one side and then on the other.

419. SCALD. As applied to flour, potatoes, etc., to submerge or wet with water at a temperature of 160 degrees Fahr., or more—sufficiently hot to dissolve the bands of the starch cells and expose the individual grains composing it, generally to the action of the yeast plant.

To *scald* utensils, etc., to dash over with boiling hot water.

420. SCALLOP. A mollusk similar to an oyster. The shell is corrugated and radiates from the center. *Scalloped dishes.* Dishes made in the form of a scallop shell.

421. SCALLOPED OYSTERS. Oysters baked in scalloped dishes, or rolled in cracker or bread crumbs and baked.

422. SHERBERT. A water ice made from the juice of fruit, diluted, sweetened, flavored and frozen. Liquors are sometimes added.

423. SHORTENING. Lard, butter, suet, marrow, etc. Mixed in pastries to make them more friable and more easy to crumble.

424. SLAW. Sliced cabbage with vinegar,

salt and pepper—served cooked, (hot or cold) or raw.

425. SODA. A white, alkaline compound (sodium bicarbonate) consisting of white powder, or dry transparent crystals. Sometimes used to neutralize acids found in sour doughs; also used to manufacture baking powder, or alone in the preparation of certain mixtures in the kitchen.

426. SOUFFLE. A side dish served hot from the oven, made of beaten eggs, flour, etc.

427. SOY. A bottled sauce obtained from China and India. Composition uncertain.

428. SPAGHETTI. See Par. 372.

429. SPARE RIBS. Ribs of pork with but little flesh attached.

430. SPONGE. A thick batter, or soft dough, made from flour, water and yeast. It is the first step in the process of bread making. A sponge is said to be *green* or *young* before it has fully matured; *ripe* when it has matured, and is ready to be broken up preparatory to making the dough; and *old*, or *rotten*, when it has passed the *ripe* stage, and having risen and fallen more than

once, probably contains a relatively high percentage of acid, making it sour.

431. STALE BREAD. Bread in which all free moisture has so combined with the crumb as to give it the appearance of dryness. This takes place when the bread is from eighteen to twenty-four hours old.

432. STARCH. A white, odorless, tasteless, flour-like compound, insoluble in cold water, alcohol and other liquids. Found in all grains and seeds of plants, with but few exceptions. It is readily transformed into sugar compounds.

433. STEARIN. That portion of fats, lard, suet, etc., that gives it solidity.

434. STERILIZE. To destroy harmless or disease bearing bacteria. Generally accomplished in the utensils used in the kitchen by the use of boiling hot water to which lye is sometimes added. The sterlizing of all utensils used in handling yeasts and doughs is absolutely necessary, in order to prevent souring.

435. STOCK. The liquid or jelly obtained by boiling meat, bones, etc., for several hours, in water. It is the basis of all good soups.

436. SUCCOTASH. Green corn and beans boiled together.

437. SUET. The large folds of fat found attached to the inner walls of the hind quarter of beef.

438. SWEETBREADS. The thymus gland (found in the neck of slaughtered animals) and the pancreas (found near the stomach). They have very little natural flavor, but are very tender and considered a delicacy. Those from the calf are best, next best from the beef, sheep and hog in the order named.

439. TALLOW. Properly speaking, it is the fat of beef, sheep or other animals, from which a portion of the oil has been extracted making it harder than the natural fat.

440. TAPIOCA. A starch extracted from a South American plant. Used in puddings. Very similar to *sago* and *arrow root.*

441. THYME. A herb used in seasoning.

442. THYMUS GLAND. A gland of the neck of slaughtered animals used as *sweet bread.*

443. TRIPE. A term applied to the stomach of the beef, after being cleaned and boiled.

It has but little flavor, but is considered by many as a very valuable food. It is very easily digested.

444. VINEGAR. The sour liquid formed by the spontaneous acetic fermentation, or artificial oxidation of beer, wine, cider, etc.

445. YEAST. Yeast grows in small spores that reproduce themselves every four or five hours. The spore is found anywhere, floating about in the air, and wherever the proper conditions of food, moisture and warmth are found, it grows spontaneously. While in a dry state it is unaffected by the ordinary temperatures, though freezing, or a temperature above 160 degrees Fahr., will kill it in the liquid state. While it "works" or grows, it evolves a carbonic gas which gives to the dough a cellular structure. While proving, the dough should be kept in an even temperature of about 80 degrees, and this should be about the average temperature of the dough ingredients when mixed together.

INDEX.

PARAGRAPH

Adulteration of coffee 127
Adulteration of lard 205
Adulteration of olive oil 188
Aerated bread 251
Albuminoids 1
Albumen 252
Allspice 253
Ambergris 254
Aniline 255
Aniseed 256
Annatto 257
Arrow root 258
Articles, size of, to cook 43
Artificial butter 207, 386

Bacon 78, 140
Bacteria 212
Bakery dividend 92
Baking 259
Baking powder ..... 93—95, 260
Baking temperature 261
Balanced diet 22
Barbecue 262
Basil 263
Baste 264
Batter 265
Bay leaves 266
Bean component ..... 97—100
Beans, cooking of 62, 98
Beef cheese 75
Beef extract 267
Beef juice 268

Beef stock..... 40
Beef, substitutes for..... 73
Beef tea..... 269
Beets..... 110
Bench..... 270
Bisk..... 271
Blanch..... 272
Blood heat..... 273
Body, composition of..... 23
Boiled milk..... 164
Boiled beef..... 42
Boiling..... 274
Bouillon..... 275
Brain foods..... 32, 33
Brains..... 276
Braising..... 277
Bread and rolls..... 88
Bread, flour, etc..... 83—92
Breakfast foods..... 32
Broiling..... 278
Browned potatoes..... 105-e
Bull meat..... 417
Bung sausages..... 417
Butter..... 152, 192
Buttermilk..... 172

Cabbage..... 108
Calorie..... 279
Canned butter..... 195
Canned goods, mold in..... 224
Canning..... 220
Capers..... 280
Caramels..... 281
Caraway seed..... 282
Carbohydrates..... 283
Carbohyrdates, fuel value..... 34
Carbohydrates, propertles of..... 27
Carrots..... 110, 141
Casein..... 284

Casings..... 285
Cassia..... 286
Celery salt..... 287
Centigrade..... 288
Cheese.....173—182
Cheesed potatoes.....105-g
Chef..... 70
Chemical preservatives..... 218
Chervil..... 289
Chicory..... 290
Chile..... 291
Chili beans.....100-e
Chili con carne.....100-e
Chives..... 292
Chocolate..... 293
Chowder..... 294
Chutney..... 295
Cinnamon..... 296
Citron..... 297
Cloves..... 298
Cochineal..... 300
Cocoa..... 299
Coffee component.....121—127
Coffee, substitutes..... 127
Cold, a preservative.....47, 212
Cold storage..... 215
Comina..... 301
Composition of body..... 23
Compound..... 302
Concentrated foods..... 32
Condensed milk..... 167
Condiments.....30, 135, 303
Cooking, effect of..... 51
Cooking, elementary principles..... 36
Cooking, objects of.....36—70
Cornmeal..... 91
Cottage cheese..... 178
Cottonseed oil.....189-190
Crackling bread..... 305

Cracklings..... 304
Cream..... 170
Cream bread..... 306
Cream cheese..... 175
Creamed potatoes.....105-i
Croquettes.....75-307
Croutons..... 308
Crullers..... 309
Crumb..... 310
Crumbs..... 86
Curry powder..... 311
Cutlets..... 312

Deep lard frying.....64-68
Definitions.....251-445
Desiccated milk..... 165
Desserts..... 156
Devilled..... 313
Devilled meat..... 314
Diet, balanced..... 22
Diet, one-sided..... 22
Disease germs in milk..... 161
Dividend, bakery..... 92
Double cream..... 171
Dough..... 315
Dough-break..... 316
Doughnuts..... 317
Dredge..... 318
Dried fruits.....116-120
Dried peas.....100-b
Dried sweet corn.....100-g
Dried vegetable component.....97-100
Dryness, a preservative.....212, 214
Dumplings..... 319

Edam cheese..... 180
Eggs..... 320
Egg plant..... 321
Elementary principles of cooking.....37-70

Entree..... 322
Estragon..... 323
Extractives.....25, 324
Extracts from lectures by the author.....232-250
Evaporated cream..... 166
Evaporated fruits.....116-120
Evaporated milk.....133, 166
Fahrenheit..... 325
Farina..... 326
Fats, composition of..... 183
Fats, fuel value of..... 34
Fats, properties of..... 26
Fennel..... 327
Ferment..... 328
Filled cheese..... 177
Fillet..... 329
Fillet of beef..... 330
Fillet of fowl..... 332
Fillet of pork..... 333
Fillet of rabbit..... 334
Fillet of veal..... 335
Fireless cooker.....100-a
Flavors.....50-53, 147
Flour, economy in use of..... 84
Food definition of..... 23
Foods, function of..... 31
Food values, table of..... 35
Forcemeat..... 331
Frankfurters..... 417
Frappe..... 336
Fresh vegetables.....101-114
Fresh water..... 57
French fried potatoes.....105-b
Fricasse..... 337
Fried cakes..... 338
Fritters..... 339
Fruit butter..... 120
Fruit flavors..... 116

Fruits..... 37
Frying, general principles.....64-69
Fuel values.....34-35
Full cream cheese..... 174

Garlic.....143, 340
Garnish..... 341
Garrison ration, general remarks..... 71
Gelatin..... 342
Gelatinoids..... 2
Gems..... 343
Germ..... 344
German boiled potatoes.....105-e
German fried potatoes.....105-d
Giblets..... 345
Ginger.....146, 346
Glace..... 347
Glucose..... 348
Gluten..... 349
Graham flour..... 350
Green fruits..... 117
Grilled..... 351
Grits..... 352
Gruel..... 353

Ham.....140, 354
Hamburg steaks..... 75
Ham butts..... 355
Hard bread..... 90
Hard water..... 56
Hashed potatoes.....105-f
History of the ration.....1-12
Herbs..... 145
Hominy.....100-h, 356
Hops..... 357

Ice..... 358
Icing..... 359
Issue beans..... 100-a

Jam..... 360
Jelly..... 361
Jelly, mold in..... 222

Kettle rendered lard..... 204
Kidney beans.....100-d
Kidneys..... 362

Ladled butter..... 194
Lamb chops..... 363
Lard and lard compounds.....149-151
Lard.....198-211, 364
Lard compounds..... 206
Lard, to..... 365
Lean meat..... 77
Leaf lard..... 201, 366
Leaven..... 367
Lectures, extracts from.....232-250
Leek..... 368
Lentils..... 369
Lettuce..... 111
Lima beans.....100-c
Limburger cheese..... 179
Lights..... 370
Liver..... 371
Liver sausage..... 417
Lyonnaise potatoes.....105-h

Macaroni..... 372
Mace..... 373
Malt..... 374
Majoram..... 375
Marrow..... 376
Mayonnaise..... 377
Meat cutting..... 74
Meat, general remarks.....72-83
Meringue..... 378
Methods of cooking..... 39
Meats, preservation of..... 76

Meats, special uses..... 75
Milk.....158-172
Milk component.....133, 314
Milk toast..... 87
Mineral matters..... 28
Mint..... 379
Molds.....212, 213, 221—231
Mold growth, effects of..... 226
Mold, prevention of..... 231
Mousse..... 380
Muffins..... 343
Mulligatawny..... 381
Mustard.....144, 382

Nasturtium..... 384
Neutral lard.....177, 200
Non-poisonous preservatives..... 219
Noodle lard..... 202
Noodles..... 383
Nutmeg..... 385
Nutrition, principles of..... 20

Oils, composition of..... 183
Okra..... 387
Olein.....183-184, 388
Olein..... 388
Oleomargarine.....152, 197, 386
Olive oil..... 188
One-sided diet..... 22
Onions.....101, 111, 141
Oregano..... 389
Oseille..... 390
Oven counts..... 391
Oven, quick..... 392
Oven, slow..... 393
Oysters, frying..... 67
Oyster plant..... 394

Pan cakes..... 89
Pancreas..... 395
Parsley..... 397
Parboil..... 396
Parsnips.....109, 141, 398
Pasteurized cream..... 192
Pasteurized milk..... 163
Patties..... 379
Peas..... 99
Pepper.....142, 400
Piccalilli..... 402
Pistachio..... 403
Pits, storage in..... 216
Poach..... 404
Pork sausage..... 417
Porridge..... 405
Potato component.....101,-114
Potpies..... 41
Powdered milk.....134, 165
Predigested foods..... 32
Preservation of foods.....212-231
Preservation of meats..... 76
Prevention of mold..... 231
Prevention of waste..... 81
Prime steam lard..... 203
Principles of nutrition..... 20
Protein.....25, 34, 406
Proving..... 407
Prune component.....97-100
Pyrometer..... 408

Radishes..... 1 1
Ragout..... 409
Ration balanced..... 21
Ration, emegency..... 15
Ration, field..... 16
Ration, garrison..... 18
Ration, history of.....1-12
Ration, haversack or reserve..... 17

Ration, marching..... 13
Ration, kinds of.....13-18
Ration, travel..... 14
Refuse.....29, 240
Rendering..... 410
Renovated butter..... 196
Rice.....100-f
Ripened fruits..... 117
Roasting.....39, 411
Roquefort cheese..... 181

Saccharin..... 412
Saffron..... 413
Sage..... 414
Sago..... 415
Salads..... 155
Salsify.....109, 141, 395, 416
Salt..... 139
Salt a preservative.....219-b
Saratoga chips.....105-a
Sauce for desserts..... 157
Sausage.....75, 417
Sausage, mold in..... 223
Saute..... 418
Sauteing..... 69
Scald..... 419
Scallop..... 420
Scalloped oysters..... 421
Seasoning, importance of..... 70
Seasoning..... 135
Separator milk..... 168
Shallow lard frying..... 69
Sherbert..... 422
Shortening..... 423
Sirup.....130, 154
Size of articles to cook..... 43
Skimmed milk..... 168
Slaw..... 424
Soda..... 425

Soft water..... 55
Sorrel..... 390
Souffle..... 426
Soup..... 82
Soup stock..... 80
Soy..... 427
Spaghetti..... 428
Spare ribs..... 429
Spices..... 146
Spices, 2 preservatives.....219-d
Sponge..... 430
Stale bread..... 431
Starch..... 432
Stearin.....183-184, 433
Sterilize..... 434
Sterilized milk..... 169
Stews..... 41
Stock..... 435
Storage in pits..... 216
Succotash..... 436
Suet.....150, 437
Sugar.....130 132
Sugar, a preservative.....219-a
Summer sausage..... 417
Sweetbread.....395, 438, 442
Swiss cheese..... 176

Table of food values..... 35
Tallow.....187, 441
Tapioca..... 440
Tea..... 128
Texture of bread, etc..... 44
Thyme..... 441
Thymus gland..... 442
Tomatoes.....101, 107, 141
Tripe..... 443
Tuberculosis..... 160
Turnips..... 110

Vegetables, fresh.....101-114
Vegetables, preservation of..... 48
Vinegar..... 444
Vinegar, a preservative.....219-c
Vinegar, properties of..... 148

Waste.....29, 81
Water boils, when..... 62
Water, characteristics of..... 24
Water, necessity of in cooking..... 54
Water, properties of.....54 63

Yeast.....94-96, 445

UNIVERSITY OF CALIFORNIA AT LOS ANGELES
THE UNIVERSITY LIBRARY
This book is DUE on the last date stamped below

LAUG 5 1947

APR 2 4 1951

A 000 697 622 9

UC
700
H69m